

MOTOR AGE



TRANSCONTINENTAL
TOURING NUMBER

FAKES

VERSUS

A-C EFFICIENCY

Freakish spark plug construction is intended, primarily, to appeal to the motorist, like quack patent medicines appeal to the chronic invalid. It is mostly a catch-penny scheme and rarely receives the endorsement of a practical engineer.



AC-TITAN plugs typify the infinite and painstaking degree of accuracy which has made our product the unqualified choice of most of the leading authorities on gas engine combustion.

Improvements in basic design of spark plugs are few and far between, but there are many freakish styles and shapes constantly appearing for which most everything is claimed and nothing proven.

Lack of space prevents our describing in detail the many "catch-penny" arguments advanced by unscrupulous plug manufacturers to stampede the entire industry into the thought that they have accomplished over night that which has taken responsible, dependable manufacturers years to achieve.

What we want to emphasize is the fact that when a new plug is brought out, or a design is changed, extravagant claims are made regarding features of this kind but very seldom is an improvement made to the basic design of the plug; an improvement which will increase efficiency and make the plugs gas tight under all conditions.

AC-TITAN and CICO plugs embody these improvements. Their use insures a smooth running motor at all speeds, eliminates pre-ignition and affords the highest degree of efficiency attained in spark plug construction.



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This is the real secret of the value of POLARINE:

That because it maintains the correct lubricating body at any motor speed or temperature it *lessens wear* and *lengthens the life* of every moving part.

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GASOLINE**
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Sparton wins after three years of litigation and the loser must pay costs.

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This decision of the superior court disposes of the sixth action brought by the Klaxon people against firms handling SPARTON horns.

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The Sparks-Withington Co.
Jackson, Michigan





MOTOR AGE



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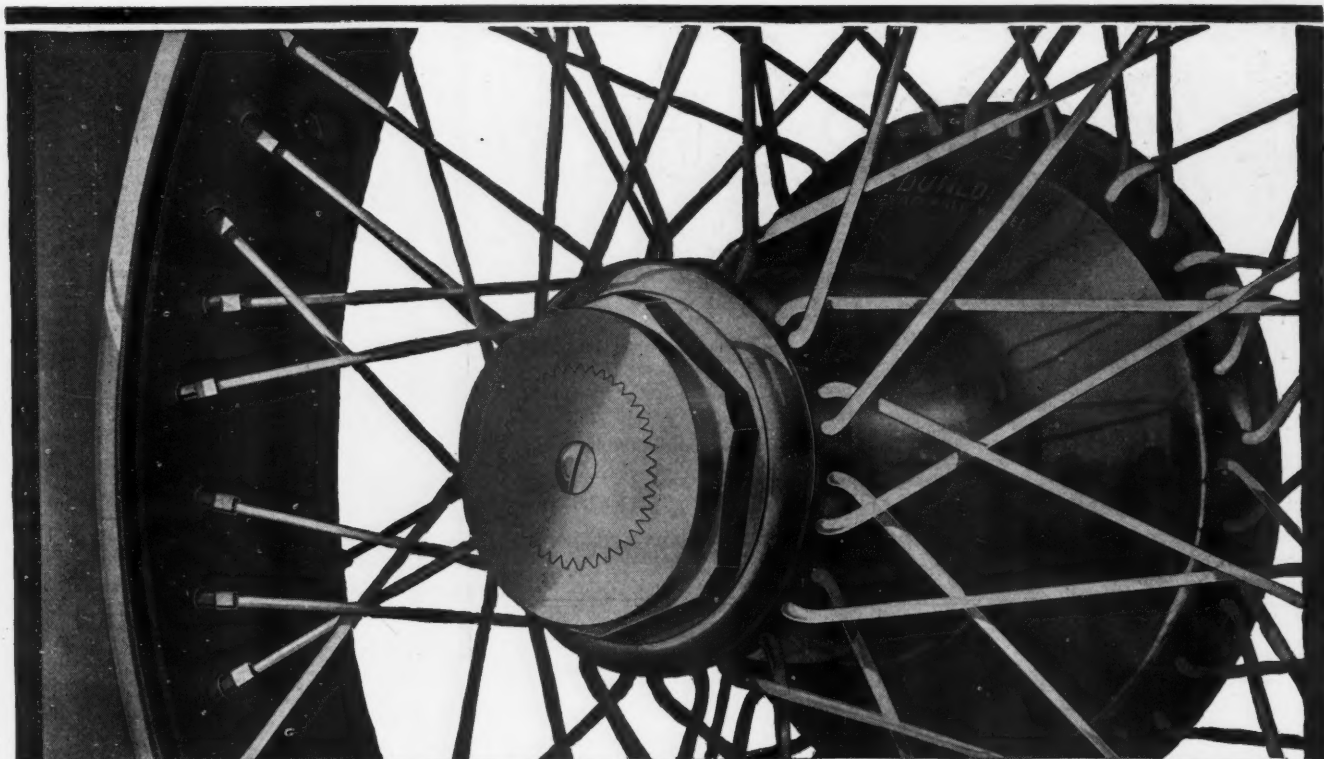
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*The Demand is Daily Becoming More
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DUNLOP

DETACHABLE WIRE WHEELS

Motorists soon will be a unit in equipping their cars with the DUNLOP, for they know that the days of the heavy-riding, tire-consuming wood wheels are numbered.

DUNLOP WIRE WHEELS are far stronger than wood wheels. They withstand blows that would crush wood wheels. The DUNLOP may bend but will never break.

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and tire-saving, all use DUNLOP DETACHABLE WIRE WHEELS.

It is so simple and easy to remove and replace DUNLOP WHEELS—when a change of tires is necessary—that a woman or boy can do it in 30 seconds. No loose parts, no removable nuts—interchangeable right to left, front or rear.

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MOTOR AGE



San Francisco Bound? *J.C. Burton*

EDITOR'S NOTE—This is an article written in miles, not metaphors. In its preparation, the author has referred to the *Automobile Blue Book*, the *Rand-McNally atlas* and the hotel guide more often than he has thumbed the pages of *Soule's Synonyms*, *Roget's Thesaurus* and *Webster's dictionary*. If its aim is realized, *Motor Age* herewith spreads before the prospective transcontinental motorist a feast of facts, served, we hope, in an appetizing, coherent way. To change a figure of speech suddenly, this article is intended to be a cataclysm of helpful information, coming from sources which we believe are reliable, authentic and authoritative.

ALTHOUGH we are now slush-deep in February and will not be knee-deep in June for 4 months of thaw, rain and mud, the time has come, as the walrus once remarked to Alice

to plan the 'Frisco tour,
To talk of routes and desert trials and small town cartes des jours.

For in mansions, where logs are crackling in fireplaces; in apartment buildings, where steam radiators pound and hiss rebelliously; in farm houses, where the domes of base burners are as red as the sun at the close of an Arizona day, motorists are planning the tour to California, the most cosmopolitan trek ever to leave its imprint in the dust of the western hemisphere. The blizzard may howl at the doors; it cannot silence the seductive voice of the road. The snow may fall in blinding fury; it cannot veil the vision of a land bathed in perpetual sunshine and redolent with roses and orange blossoms.

"On to California," the cry of the gold-mad Forty-niner, is the slogan of the 1915 motorist. With the coming of spring, thousands will be San Francisco bound. The screech and snarl of motor horns will be heard on roads where once the tinkling bells of the padre's donkey and the weary creak of the prairie schooner's wheels announced the approach of the adventurers of other days. The state of paradoxes, which combines Switzerland's mountains with Italy's shores; the Lorelei of the American sisterhood has called to the modern pilgrims and a twentieth-century Chaucer is about to dip his pen in indelible ink and write the tales of a pilgrimage to the countless shrines, natural and artificial, of which California can boast.

Already, on the southern transcontinental highways, there is a swirl of dust. Three months hence, it will be a dense cloud and by mid-summer, a tornado. The tour to California and the two expositions, which commemorate the completion of the Panama canal, will be a motor migration of unprecedented magnitude. Garage men, west of the Missouri river, will sell more gasoline in a week during the months of June, July, August and September than they sold in a year previous to 1915. With the first snows of November and December, more Americans will be able to talk intelligently of the wonders of their heretofore neglected country than ever before in the history of this nation, unappreciated and unexplored by thousands of native tourists until Mars blockaded the ports of Europe and made the seeing of America imperative.

In the snow-bound days of planning and preparing for the California tour, motorists are asking a common question—What is the



GARDEN OF THE SANTA BARBARA MISSION, FOUNDED IN 1786, AND THE ENTRANCE AND BELFRY OF THE SAN CARLOS CHAPEL

best route to the Pacific coast? To give an unbiased, truthful answer, to select a specific ocean-to-ocean highway or a combination of roads and to stamp it or them as the superior of all the others is to spend much time and labor in investigation and to invite criticism—some of it deserved perhaps but most of it prompted by prejudice—into your house. It is not a thankless task, however, and for this reason Motor Age will attempt it, hoping that should its recommendations be followed, hundreds of tourists will find the trip less arduous and more enjoyable than if they had gone blindly forth and discovered the good roads and the bad roads for themselves.

Three Routes Are Preferred

There is no best route to the Pacific coast. When the hopes of the promoters of the Lincoln highway are realized, when that great memorial road is a broad ribbon of cement from New York to San Francisco, such a statement might be justly challenged as false but at the present time there is no ocean-to-ocean thoroughfare deserving of the superlative adjective, best. There are, however, three highways—two linking the Atlantic with the Pacific and a third tributary to them and taking the tourist through the scenic Rocky mountains—that we sincerely believe are preferable and which, in addition, will carry 85 per cent of the 1915 transcontinental travel. These three routes have been selected only after the most careful analysis and study of reports made by unprejudiced pathfinders who have traveled them. Their excellence has been judged by standards other than road surface alone, hotel and garage accommodations, scenic and historic attractions, grades to be climbed and arid regions to be crossed being considered, together with

several others factors, before a final selection was made.

These three preferable routes are represented on the four-page map, which is a supplement to this issue of Motor Age, by the broad red lines. The northern red route is a combination of the Central New York highway, composed of the Adirondack and Iroquois trails and the northern trans-state roads across Ohio and Indiana, and the Lincoln highway from Chicago to San Francisco, with two options across the state of Iowa and a third option—the old Overland trail—between Ogden, Utah, and Reno, Nev. The central red route is a combination of the Red Line trail across Kansas to Colby and the Pike's Peak highway to Salt Lake City. The southern red route is the National Old Trails highway, with an option at Springerville, Ariz., of following the Ocean-to-Ocean highway to San Diego.

These three red routes can be roughly outlined by states and cities or towns as follows:

NORTHERN RED ROUTE—3,504 MILES

New York—New York, Poughkeepsie, Albany, Utica, Syracuse, Geneva, Rochester, Batavia, Buffalo and Fredonia.

Pennsylvania—Erie.

Ohio—Ashtabula, Cleveland, Oberlin, Norwalk, Fremont, Toledo and Bryan.

Indiana—Butler, Kendallville, Ligonier, Goshen, South Bend, La Porte and Valparaiso.

Illinois—Chicago, Aurora, De Kalb, Dixon and Sterling.

Iowa—Clinton, Cedar Rapids, Marshalltown, Carroll and Denison.

Nebraska—Omaha, Columbus, Grand Island, Kearney, North Platte and Big Springs.

Colorado—Julesburg.

Wyoming—Cheyenne, Laramie, Walcott, Rawlins, Frown, Rock Springs, Granger and Evanston.

Utah—Salt Lake City, Fish Springs, Kearney's Ranch.

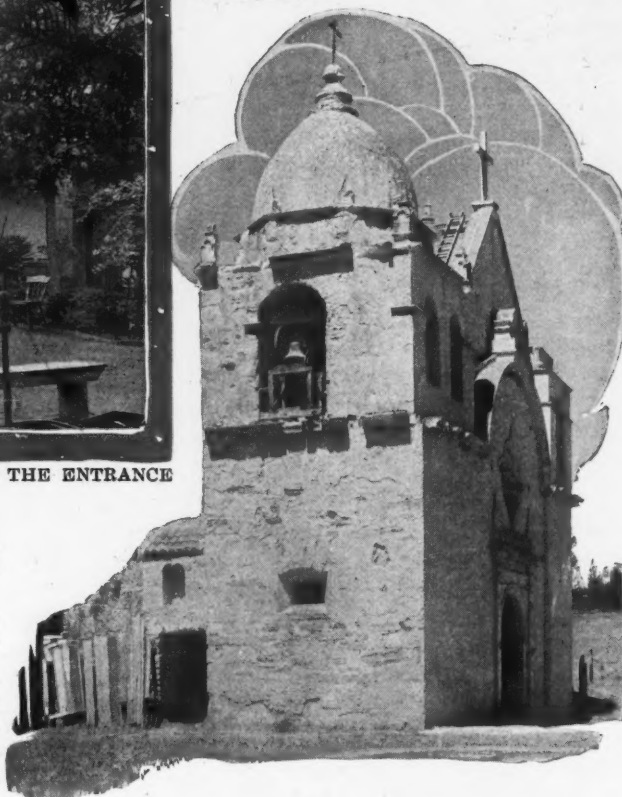
Nevada—Ely, Eureka, Austin, Fallon, Hazen and Reno.

California—Truckee, Sacramento and San Francisco.

Options to Northern Red Route

Iowa—River-to-River Road—Clinton, Davenport, Iowa City, Grinnell, Des Moines, Atlantic and Omaha, Neb.

Great White Way—Clinton, Davenport, Muscatine, Oskaloosa, Des Moines, Atlantic and Omaha, Neb.



Utah and Nevada—Old Overland Trail—Ogden, Brigham, Kelton, Utah; Coble, Wells, Elko, Battle Mountain, Winnemucca, Lovelock, Hazen and Reno, Nev.

CENTRAL RED ROUTE—1,406 MILES

Missouri—Kansas City.

Kansas—Topeka, Manhattan, Beloit, Stockton and Colby.

Colorado—Vona, Limon, Colorado Springs, Buena Vista, Leadville, Glenwood Springs, Rifle and Meeker.

Utah—Vernal, Duchesne, Heber, Provo, Midvale and Salt Lake City.

SOUTHERN RED ROUTE—3,147 MILES

District of Columbia—Washington.

Maryland—Baltimore, Frederick, Hagerstown and Cumberland.

Pennsylvania—Uniontown.

West Virginia—Wheeling.

Ohio—Coshocton, Zanesville, Columbus, Xenia and Dayton.

Indiana—Richmond, Newcastle, Indianapolis and Terre Haute.

Illinois—Effingham and Vandalla.

Missouri—St. Louis, Mexico, Marshall and Kansas City.

Kansas—Ottawa, Herrington, McPherson, Lyons, Great Bend, Dodge City, Garden City and Syracuse.

Colorado—Lamar, La Junta and Trinidad.

New Mexico—Raton, Wagon Mound, Las Vegas, Santa Fe, Albuquerque, Socorro and Magdalena.

Arizona—Springerville, Holbrook, Winslow, Flagstaff, Williams, Ashfork and Kingman.

California—Needles, Barstow, San Bernardino and Los Angeles.

Option to Southern Red Route

Arizona and California—Ocean to Ocean highway from Springerville, Ariz., to San Diego, Cal., via Globe, Phoenix, Palomas and Yuma, Ariz., and Brawley and El Centro, Cal.

Having made specific and logical route selections, it resolves upon the writer to justify and defend them. This is not such a difficult task as it may seem

at first sight. The selection of the Lincoln highway, with the River-to-River road and the Great White Way as options across the state of Iowa, as the preferable northern thoroughfare west of Chicago probably will pass unchallenged. Temporarily, we have sidestepped an inevitable punch of protest by giving the two routes between the Great Salt Lake and Reno equal red prominence on the map.

Two Trails in Northwest

In the territory north of the northern boundary lines of Missouri, Kansas and Colorado and between the Mississippi river and the Rocky mountains, there are but two parallel routes of any great length that can be termed rivals of the Lincoln highway. These are the Northwest trail, connecting Minneapolis and St. Paul with Seattle and Tacoma and with a feeder road to the Glacier National park branching off at Missoula, Mont., and the Black and Yellow trail, crossing southern Minnesota, central South Dakota and northern Wyoming and terminating at the western border of the Yellowstone National park. Neither of these routes goes direct to California and the motorist traveling them will be forced to detour to the Lincoln highway in order to take in the two-ring world's fair circus that the Golden state is staging this year. They have not the enthusiastic organization and consequently have not received the attention that gradually is making the Lincoln highway a perfect transcontinental route. Therefore, they cannot be seriously considered as rivals of the memorial road that is to perpetuate the name of the great emancipator until the day of the millenium.

The two optional routes to the Lincoln highway across Iowa are deserving of a paragraph of mention at this point. The River-to-River road and the Great White Way are the equal, if not the superior, of the memorial thoroughfare and for this reason are given equal prominence with the Lincoln highway on the map. The Great White Way is the dirt road ideal, being wide, well-graded, carefully marked and very fast. The River-to-River road is equally as good. From Chicago, the Iowa link of the Lincoln highway is the most direct route between Clinton and Omaha but the motorist will have no reason for regret

should he detour at Sterling, Ill., drive to Davenport and from there travel across Iowa on the Great White Way or the River-to-River road.

Indian Trails Now Boulevards

East of Chicago, the Lincoln highway has a rival and a superior rival at that. It is the Central New York route, improved almost every yard of the 1,034 miles between New York city and the Illinois metropolis. The Ohio and Indiana sections of the two routes are probably of equal merit but the hard macadam roads of the Empire state are so much superior to many stretches on the Lincoln highway in southern Pennsylvania that the

Central New York route is given the preference. To follow the Adirondack and Iroquois trails from New York to Cleveland is to experience the same unjolted pleasures as to drive up Fifth avenue or Michigan boulevard. Were the Indians to travel this road today, they probably would wear out the tough leather soles of their moccasins before they reached Albany. In all probability, the eastern section of the Lincoln highway will be greatly improved in the early spring but only improvements of the most permanent kind will make it the equal of the hard-surfaced and widened path once trod by the braves of the Five Nations.

Which Road Around Great Salt Lake?



AND now our guard is down. We are braced for the impending blow. If you are San Francisco bound on the Lincoln highway, leave the memorial road at Evanston, Wyo., and follow the northern route, the old Overland trail of the stage-coaching days, across Utah and Nevada. This is not a warning but a recommendation. Should you disregard such advice and take the southern route through Salt

the unfortunate one, singled out by an unkind fate, that will be caught in a rainstorm which makes the road temporarily impassable or whose car will break down in the heart of an isolated, water-famed region.

We sincerely believe that the eastern motorist, traveling for the first time in the west and unacquainted with conditions in the country beyond the Missouri

river, should be overly cautious and should play safe, to use the vernacular of the gambler; that in choosing between two routes, he should select the road that offers the fewest chances for accidents even though the difference in safety between the two is so slight as to be almost negligible. For this reason and without malice or prejudice, Motor Age recommends the north route, via Ogden, as preferable to the south route, via Salt Lake City.

The question of which is the better route around the Great Salt lake has become a nation-

wide argument. Politics and civic pride are involved. Salt Lake City and Ogden naturally have taken sides and daily are making claims and counter claims, some of them worthy of serious consideration and others exaggerated and prompted by prejudice. To appoint oneself judge of the merits of the two roads is only to



A RESTING DRIVE, BOWERED BY THE FOLIAGE OF EUCALYPTUS TREES, IN SOUTHERN CALIFORNIA

Lake City and across the Great American desert, doubtlessly you will reach Reno without suffering hardships of any consequence and experience only the slightest inconveniences. Probably you will be one of the 999 out of every 1,000 tourists who will drive over the arid waste land in absolute safety. Then again, you may be



A STRETCH ON THE FAMOUS RIVER-TO-RIVER ROAD, THE WONDERFUL DIRT HIGHWAY ACROSS IOWA

become embroiled in a tumultuous, calorific, acrid debate. In justice to both sides, Motor Age herewith prints the testimony of the proponents of each route, that of the Blue Book representative whom we believe is impartial and that of A. L. Westgard, the pioneer motor pathfinder.

Before calling the witnesses to the stand, however, we wish to call the reader's attention to Exhibit A, the map of the region crossed by the rival routes, which is printed on this page, and intrude a few words of explanation. The northern road is shown in red; the southern in black. On each route, the towns and settlements, where supplies can be secured, are shown while the names of places, offering bed and board, are underscored in red. Intermediate mileages between towns and ranches are given in black and the total mileages between centers of population, where the long trip can best be broken because of superior accommodations afforded, are printed in red. The two routes are approximately of equal length, the northern measuring 633.1 miles and the southern totalling 632.8 miles.

And now the bailiff is clearing his throat preparatory to calling the first witness, S. D. Waldon, formerly vice-president of the Packard Motor Car Co., who warns motorists not to be misled into taking the northern route by the advice of Ogden boosters and asserts that the large amount of travel over the official or Lincoln highway route is a valuable safeguard to travelers.

"Even a breakdown in the middle of the Great American desert," he declares, "would be robbed of its dangers by the certainty that within a few hours a motor car, a motorcycle, a prairie schooner or a man on horseback would pass, going one way or the other. Every ranch along the

southern route carries gasoline. Each ranch has water. And where the official route crosses the Great American desert, the county has put a well midway of the 60 miles of desert going."

Drives Desert at High Speed

Furthermore, Waldon claims to have driven the 300 miles from Salt Lake City to Ely, the Lincoln highway link of the two mooted routes, between 6 a. m. and 11 p. m., a record that which could not possibly have been made over a road not clearly defined and in good condition. Another thing in favor of the southern route, Waldon claims, is that it goes through Ely, the best branching off place on the Lincoln highway for Los Angeles.

M. S. Browning, a resident and former mayor of Ogden, testifies for the excellence of the northern route as follows:

"The southern route or Lincoln highway may be the best road around the Great Salt Lake after it is finished but at the present time, very little work has been done on this trail west of Salt Lake City and it does not look as if it will be in shape for safe travel this year. On the other hand, several hundred thousand dol-

lars have been spent on the road north of the lake."

Perhaps the most competent and least prejudiced witness is the Blue Book representative, R. A. Woodall, who covered the two routes in November with a view to determining the merits and defects of each and to obtain authoritative data for the guidance of motorists making the trip to California this year. His testimony, in part, follows:

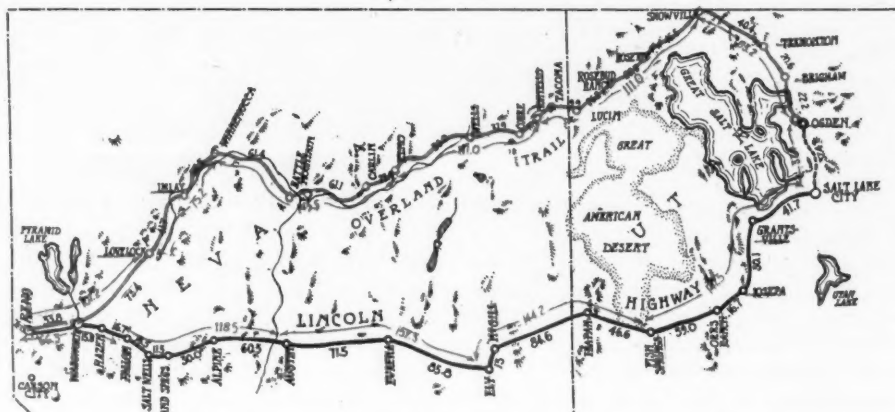
"I sincerely believe that the northern route, starting at Ogden and skirting the northern edge of the Great American desert, is superior to the southern or Lincoln highway route which goes through isolated country where water and supplies are harder to get. In Utah, the northern route has been dragged and graded to the state line and concrete bridges and culverts have been built, making it a permanent and not a disappearing road all the way. The road across Nevada has been rebuilt most of the way, the workers taking advantage of over 100 miles of abandoned Southern Pacific railroad grade in their labors of reconstruction.

"Road conditions on the two routes can be summed up as follows:

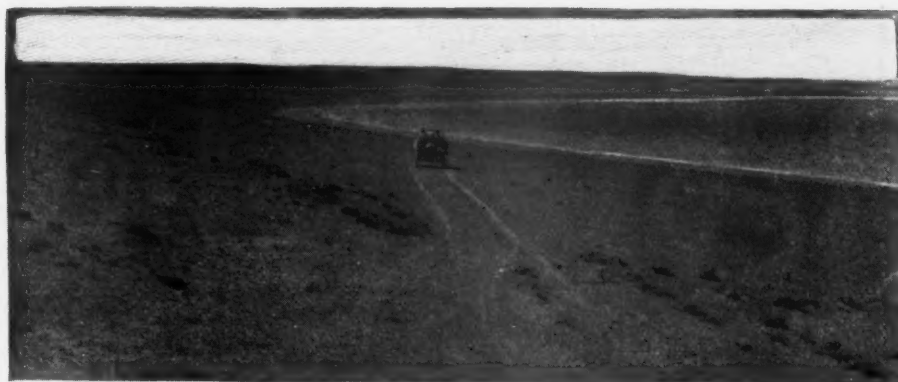
"Northern route—Ogden to Brigham, 22 miles, macadam; Brigham to state line, 155 miles, good graded dirt road; state line to Reno, 456 miles, fairly good graded dirt road.

"Southern route—Salt Lake City to Grantsville, 41.7 miles, macadam; Grantsville to Iosepa, 30.1 miles, good dirt road; Iosepa to state line, 99 miles, poor and sandy desert road; state line to Ely, 121 miles, good graded dirt road with some sections very fine; Ely to Austin, 157 miles, good dirt road but with heavy grades; Austin to Alpine, 60.5 miles, good dirt road but with heavy grades; Alpine to Wadsworth, 73.8 miles, fair dirt road; Wadsworth to Reno, 33.8 miles, good natural road.

"The north route passes through inhabited country while the south route crosses an arid region for practically the entire distance. From the outskirts of Salt Lake City to Kearney's Ranch, the road for a distance of from 60 to 70 miles



MAP SHOWING TWO DISPUTED ROUTES AROUND THE GREAT SALT LAKE AND ACROSS UTAH AND NEVADA



SMALL LAKE ON THE LINCOLN HIGHWAY NEAR MEDICINE BOW, WYO.

passes over the southern part of the Great American desert. There is no place to get water on this stretch with the exception of Fish Springs. The soil in this region is of a peculiar formation and after a rain of 5 minutes' duration, it is absolutely impossible for a car to proceed. If the tourist is unfortunate enough to be caught in this stretch in wet weather, he will be forced to remain in his marooned car until the sun comes out and dries up the road.

Steep Grades Over Mountains

"From Ely to Reno on the southern route, travel is over a fair, natural road but the greatest drawback, aside from the isolated country passed through, is the number of rather steep grades. There are practically no passes through the mountains and the tourist must go over the top of the ridges. In some places, the road follows up a draw in the mountain that in rainy weather is a river bed.

"The north route, on the other hand, parallels the railroad almost all the way from the Nevada line on. The tourist is never more than 6 miles from it and usually driving right along side of the tracks. There are towns on an average of every 10 to 15 miles and suitable hotel accommodations at all night stops with the exception of Snowville, and I am led to believe that a new hotel will be built there in the spring. The Southern Pacific maintains hotels and eating houses at

their several division points and these make excellent noon controls."

A. L. Westgard answers the much-mooted question as follows in a letter to H. M. Swetland, president of the Class Journal Co.:

"Though I must confess I have not covered every mile of the so-called north-of-the-lake route in a motor car I have, however, covered the greater portion of it in a car and have paralleled it on the railroad for the entire distance in addition to which I have recent, reliable information direct from various people who have covered the entire route in a motor car. It is my frank opinion that a tourist who is accompanied by his wife and children has practically no choice but to take the north route. The tourist is never more than 8 or 10 miles from human habitation where water and food may be obtained in case of accident. The surface of the road has been improved practically through

the entire state of Utah and in the state of Nevada parallels the railroad very closely for the major part of the distance and while it is by no means good, it is entirely travelable.

"Now, as to the south-of-the-lake route. There is more than 40 miles in one case between fresh water. Also the topography is much rougher throughout the route. In the state of Nevada one continually crosses summits of ranges and intervening desert valleys, part of which is largely composed of sticky clay which in case of a storm makes them practically impassable. Also one is out of touch with the railroad practically the entire distance with the exception of touching a north and south spur at Ely, Eureka and Austin. The flats at the south end of Great Salt Lake near Fish Springs and also the flats east of Fallon in the Carson Sink country are impassable when wet.

"However, I would be inclined to say to a tourist whose car would contain nothing but male passengers that he would be able to make the trip in reasonable comfort if the above mentioned flats and valleys were dry at the time of his passage and if he would take the chance of not running out of water."

Passing Buck to Tourist

And here the testimony ends. As passing the buck seems to be a favorite American pastime, we leave the case with the grand jury of transcontinental motorists. Whatever their decision, may they reach Reno in comfort and safety.

The selection of the Red Line-Pike's Peak highway as the preferable route across Kansas and through the Rocky



ONE OF THE FEW WASHES THE MOTORISTS WILL HAVE TO FORD IN TOURING WEST OF THE MISSOURI RIVER



ONE OF UTAH'S DRY LAKES, THE SURFACE OF WHICH IS AS SMOOTH AND LEVEL AS A BILLIARD TABLE

mountains also may be challenged since there are rival roads, both in Kansas and Colorado, worthy of serious consideration before a final choice is made. In the state of sun-flowers, there is the Pike's Peak



DIGGING WAY OUT OF SAND OF THE COYOTE DESERT. LOWER ILLUSTRATION—MOTORISTS CAUGHT IN SNOW STORM IN HIGH ALTITUDES OF NEW MEXICO

highway, connecting St. Joseph and Colby, and the Golden Belt route, branching off the Red Line route at Manhattan and passing through Abilene, Salina, Ellsworth, Russell and Oakley before joining the Pike's Peak highway at Colby. Judged by road surface, scenic and historic attractions and hotel and garage accommodations, these three routes are practically of equal merit and the Red Line route is given the preference only because it taps one of the two most logical controls on the Missouri river, Kansas City, and there-



fore probably will carry the greater part of the motor travel across Kansas.

from ocean to ocean without making detours, except to visit historic or scenic points, until they reach Springerville, Ariz., although there are two optional roads across Illinois and a parallel road—the New Santa Fe trail—in Kansas between Ottawa and Lyons. At Springerville, many tourists will branch off on the Ocean to Ocean highway in

order to go directly to San Diego and avoid skirting the Mojave desert. Such a detour, however, robs the motorist of an opportunity to visit the Grand Canyon, which is 71.5 miles north of the National old Trails highway at Flagstaff.

As far as road surface is concerned, there is little difference between the National Old Trails highway and the Ocean-to-Ocean trail from Springerville on to the Pacific coast. The question of which high-

way to take can best be decided by determining where you wish to go. A map of the two routes is printed on page 11, the National Old Trails highway in red and the Ocean-to-Ocean trail in black. The former is the longer, the distance between Springerville and Los Angeles being 750.7 miles while the distance between Springerville and San Diego is only 655.2 miles. There are more miles of desert travel on the Ocean-to-Ocean highway, however—233.6 miles as compared to 165.8 miles on the National Old Trails route.

Road Conditions on Main Routes

The discussion of road conditions on the several transcontinental routes and the designation of the months most ideal for touring on each specific highway is somewhat simplified if the country is divided into five latitudinal sections, namely: Atlantic ocean to the eastern boundary of Ohio, Ohio to the Mississippi river, Mississippi river to the Rocky mountains,

Rocky mountains to the Sierra Nevada mountains, Sierra Nevada mountains to the Pacific ocean. In the general discussion of road conditions in the paragraphs immediately following, all statements made will apply to all the routes with the exception of the most southern highways, the Borderland trail and its feeder, the Gulf States route, on which conditions are somewhat peculiar.

The roads in the first section, bounded by the Atlantic ocean on the east and the

Scenic Routes Through Scenic Rockies

THROUGH the Rocky mountains and across Utah, the Rainbow trail, from Pueblo to Grand Junction, and the Midland trail, from Grand Junction to Salt Lake City, are a combination option to the Pike's Peak highway. The tourist taking the Rainbow trail will travel through a region equally as scenic as that traversed by the Pike's Peak highway but he may find the roads a trifle more rough, according to the Blue Book representative. The Pike's Peak highway, from Glenwood Springs to the Mormon capital, is preferred to the Midland trail because the latter suffers from occasional washouts, resulting from cross drainage, which makes the roads temporarily impassible.

Old Trails Is Highway of Legends

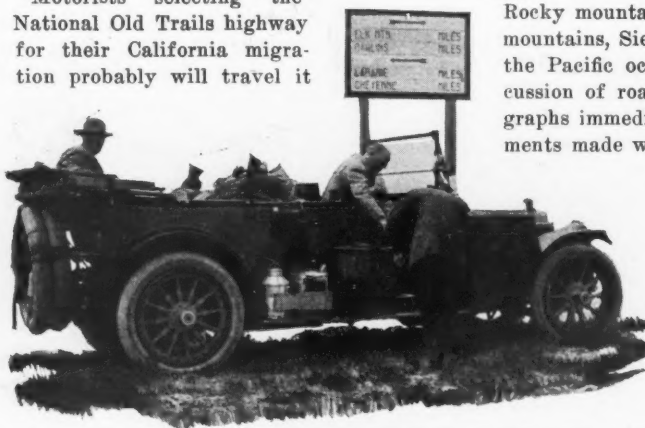
Scarcely a sentence is needed to justify the selection of the National Old Trails highway as the preferred southern route. To devote a paragraph to its defense seems the height of redundancy. Of all the ocean-to-ocean thoroughfares of the country, it is the most interesting historically. It is a trail of romance and legend, leading to the most un-American region in all America and affording the tourist who travels it an opportunity to study the history of the United States at



its pristine sources. There is a more southern route, the Borderland trail, but for motor car touring it cannot be compared with the National Old Trails highway since it has not

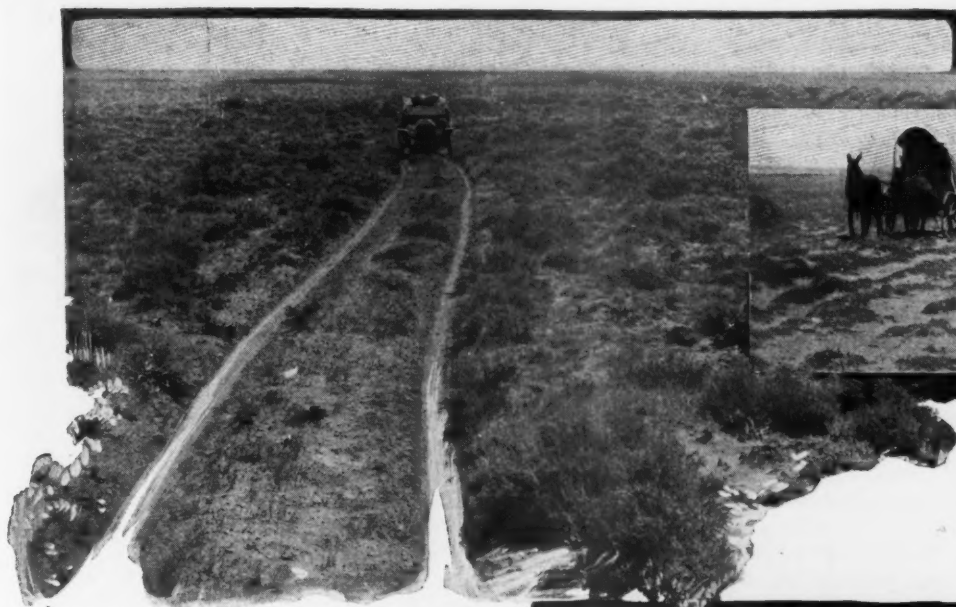
been improved in several states which it traverses because the good roads campaign has not gained in Tennessee, Arkansas and Texas the impetus that has resulted in the improvement of the historic paths of Illinois, Missouri and Kansas on which the pioneers traveled in the days before the west was won.

Motorists selecting the National Old Trails highway for their California migration probably will travel it



ONE OF THE MANY ROAD SIGNS ERECTED ALONG THE MAIN HIGHWAY ACROSS WYOMING

MOTORISTS PASSING
WAGONS OF HOME-SEEK-
ERS ON RED DESERT



THE SAGE BRUSH COUNTRY, 30 MILES
WEST OF RAWLINGS, WYO.

boundary line of Ohio on the west, are practically all hard, modern, improved highways with many long stretches the equal of metropolitan boulevards.

From Ohio west to the Mississippi, there is a great deal of improved road, a combination of brick, macadam and gravel. This is especially true in Ohio and Indiana. On the central and southern routes across Illinois, the tourist will encounter much dirt road but in the northern section, there are several improved highways and the main connection between Chicago and Clinton, the Lincoln highway, has a permanent surface at least 75 per cent of the way that inclement weather will not injure.

The section between the Mississippi river and the Rocky mountains is a plains country and quite level. All the preferred red routes cross either Iowa and Nebraska or Missouri and Kansas, or combinations of both, and the soil conditions in these four states are somewhat similar. Practically all the roads are of dirt but are exceptionally well-graded and dragged after each rain, making them the fastest and finest to drive on in the country during the touring months. During the dry season, between the middle of May and the end of October, there should not be a total of more than 4 or 5 days when these highways are unsuitable for motor car travel.

Hard Roads in the Mountains

No east and west route can traverse the Rocky mountain-Sierra Nevada section without at some point crossing the Rockies and beyond that taking the tourist through some portion of an arid or more or less desertlike region. The mountain trails as a whole are very good since the rock and granite in the vicinity of the peaks and ridges affords excellent material for road construction and only on the routes across Colorado will the motorist find heavy grades of any consequence. The ascent of

the Rockies in Wyoming is very gradual and then travel is over a high plateau with a very easy descent. On the Wyoming link of the Lincoln highway, there are numerous arroyos but the approaches to these have been cut down in practically every instance, as on other roads where these deep cross washes are found, to make the crossing easy and the motorist with the minimum amount of caution and foresight should have no trouble negotiating them. The main highways across New Mexico and Arizona are on a high plateau and the grades are exceptionally easy. The natural roads in these two states are surprisingly fine, even in the arid regions.

California State of Boulevards

In the fifth section, mountain roads and gradual grades again will be encountered but after the Sierra Nevadas are scaled, highway conditions are ideal for touring,

as California can boast of a network of boulevards the equal of any in the eastern states where millions of dollars have been spent on the construction of macadam and brick motor drives.

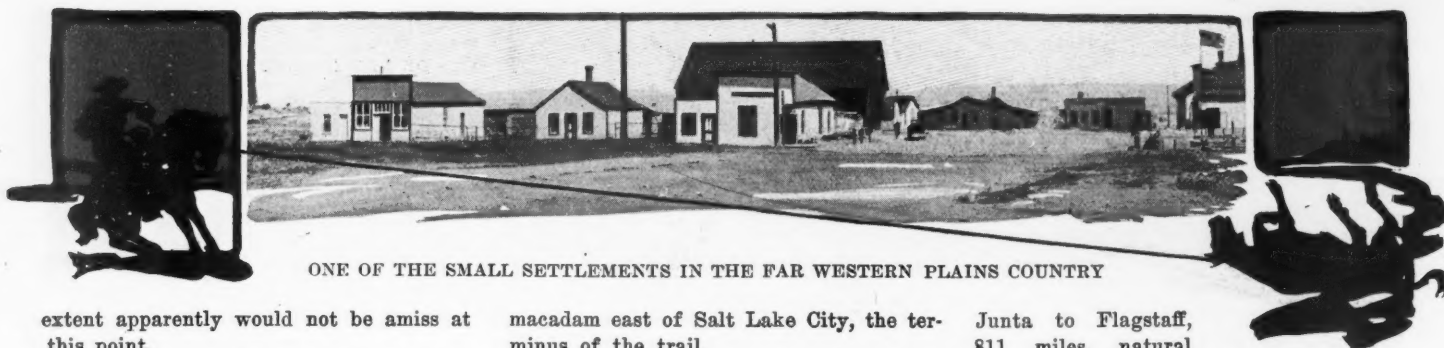
Plain, Mountain and Desert

As topography has a direct bearing on road conditions, a paragraph regarding the kind of country crossed by the three preferred red routes west of the Missouri river might be pertinent and helpful to the transcontinental tourist. From Omaha to San Francisco, 1,070 miles of the 1,859 miles of the Lincoln highway is over flat or rolling country, 334 miles is through the mountains and 445 miles across arid regions. The 1,406 miles of the Trans-Colorado route between Kansas City and Salt Lake City is divided as follows: 1,029 miles over flat or rolling country, 334 miles through the Rockies and 445 miles of desert travel. The National Old Trails highway, measuring 1,947 miles from Kansas City to Los Angeles, goes over flat or rolling country for 904 miles, takes the tourist through mountains for 559 miles and has arid stretches totalling 474 miles. Mountainous country does not mean travel over heavy grades as in many instances on all three routes, the mountain road is across a flat plateau or follows a valley.

Complementary to such information, a tabulation of the different kinds of road surfaces on each of the three preferred red routes and a statement as to their



MAP SHOWING COURSE OF NATIONAL OLD TRAILS AND OCEAN-TO-OCEAN ROUTES
FROM SPRINGVILLE ON TO THE PACIFIC



ONE OF THE SMALL SETTLEMENTS IN THE FAR WESTERN PLAINS COUNTRY

extent apparently would not be amiss at this point.

On the Central New York-Lincoln highway route, measuring 3,504 miles from New York to San Francisco, there are 1,788 miles of dirt road, 1,131 miles of permanently improved road, 329 miles of gravel road and 256 miles of sandy or sandy dirt road. This is divided as follows:

New York to Buffalo, 454 miles, macadam; Buffalo to Erie, 95 miles, macadam with some dirt; Cleveland to Toledo, 120 miles, improved road with a short stretch of gravel; Toledo to South Bend, 164 miles, improved road of brick and macadam with about 50 miles of gravel; South Bend to Chicago, 100 miles, macadam with a 20-mile dirt stretch; Chicago to Clinton, 147 miles, permanently improved except for some stretches of gravel; Clinton to Salt Lake City, 1,415 miles, dirt road; Salt Lake City to Ely, 296 miles, sandy or sandy dirt road with about 40 miles of macadam west of Salt Lake City; Ely to Reno, 331 miles, dirt road with some stretches of hard road; Reno to Sacramento, 152 miles, hard mountain road; Sacramento to San Francisco, 127 miles, macadam.

Roads on Trans-Colorado Route

There are 1,071 miles of dirt road, 251 miles of hard mountain road, 64 miles of sand or sandy dirt road and 20 miles of macadam road on the 1,406-mile Trans-Colorado route, distributed as follows:

Kansas City to Colorado Springs, 786 miles, dirt; Colorado Springs to Glenwood, 226 miles, hard mountain road; Glenwood to Vernal, 185 miles, dirt; Vernal to Duchesne, 64 miles, sand or sandy dirt; Duchesne to Salt Lake City, 145 miles, dirt and gravel in about equal proportions with the exception of a 20-mile stretch of

macadam east of Salt Lake City, the terminus of the trail.

The National Old Trails highway, in a total distance of 3,125 miles from Washington to Los Angeles, has 1,880 miles of dirt road, 560 miles of improved road, 335 miles of gravel or hard road and 350 miles of sand or sandy dirt road. This is apportioned as follows:

Washington to Frederick, 55 miles, about equal parts of macadam and dirt; Fred-

Junta to Flagstaff, 811 miles, natural dirt with the exception of about 100 miles through the mountains; Flagstaff to Kingman, 173 miles, natural dirt; Kingman to Victorville, 275 miles, sand; Victorville to Los Angeles, 104 miles, 40 miles of hard mountain road to San Bernardino and from there on macadam across southern California.

The Ocean-to-Ocean highway, the op-



HOTEL MUMM, THE BILTMORE OF THE RED DESERT COUNTRY



THE "BROADWAY" OF AUSTIN, NEV., ONE OF THE STOPS ON THE LINCOLN HIGHWAY BETWEEN SALT LAKE CITY AND RENO

erick to Cumberland, 135 miles, gravel and improved road in about equal proportions; Cumberland to Wheeling, 133 miles, improved road with some gravel; Wheeling to Columbus, 128 miles, brick road almost all the way; Columbus to Indianapolis, 171 miles, permanently improved road with about 40 miles of gravel; Indianapolis to

Terre Haute, 70 miles, gravel; Terre Haute to St. Louis, 173 miles, dirt; St. Louis to Kansas City, 313 miles, dirt with some stretches of improved road; Kansas City to Dodge City, 371 miles, dirt; Dodge City to La Junta, 215 miles, dirt with about 75 miles of sandy going; La

Junta to Flagstaff, 811 miles, natural dirt with the exception of about 100 miles through the mountains; Flagstaff to Kingman, 173 miles, natural dirt; Kingman to Victorville, 275 miles, sand; Victorville to Los Angeles, 104 miles, 40 miles of hard mountain road to San Bernardino and from there on macadam across southern California.

The Ocean-to-Ocean highway, the op-

tional route to southern California which branches off of the National Old Trails road at Springerville, Ariz., goes through all three varieties of country—flat or rolling, mountainous and arid. The first 146 miles, from Springerville to Globe, is over an excellent volcanic cinder trail through the sparsely settled White mountains of Arizona. With the exception of a short stretch of heavy grades between White River and Globe, the highway is surprisingly good. Between Globe and Phoenix, travel the greater part of the 110 miles is over a permanently improved road built by the government for the transport of supplies to Roosevelt Dam, 36 miles west of Globe. In the well-irrigated country between Phoenix and Arlington, there is a 48-mile stretch of fine natural dirt roads and in the 218-mile desert region between Arlington and Brawley, the trails are fairly good. From Brawley to El Centro, where the ascent of the mountains starts, the tourist travels on the well-graded thoroughfares of the Imperial valley and from El Centro on to San Diego,

drives over a boulevard cut in the sides of the Coast range.

On the Central New York-Lincoln highway route, three detours are recommended. The first is in Ohio between Fremont and Bryan and eliminates Toledo from the itinerary as well as decreasing the total mileage approximately 20 miles. The second detour is a cutoff from Big Springs to Chappell, Neb., and probably will be taken by the majority of Lincoln highway tourists not attempting the trip to Denver via Julesburg.

Routes Around Lake Tahoe

The third detour branches off the memorial road at Reno and takes the motorist south through Carson City and Myers, thence around the southern edge of Lake Tahoe. This is a more scenic route at this picturesque point than the northern road from Reno to Lake Tahoe

although the latter is over better roads despite the heavy mountain grades encountered between Reno and Truckee. From the southern shores of the lake, the tourist has the choice of returning to Truckee and there pick up the Lincoln highway again or driving directly west to Sacramento. The Lincoln highway route between Truckee and Sacramento is advised since there are several worn out and rough stretches between Placerville and Folsom on the more southern option.

There are several other detours in the Lincoln highway as well as on the other transcontinental routes that should be considered by San Francisco-bound motorists before starting on the gasoline-scented pilgrimage and these will be discussed further along in this article in connection with side trips to places of scenic and historic interest.

More popular than the Ocean-to-Ocean highway with winter and early spring tourists is the National Old Trails highway which west of Kansas is seasonable 12 months of the year and an ideal transcontinental thoroughfare from September 1 to July 1. Motorists who are averse to extreme heat had best avoid it during July and August as they may become overpowered and melt under the intense rays of the sun while touring near the Mojave desert and in the Imperial valley where the thermometer at times is unable to register the temperature that sometimes reaches 160 degrees in the sun. Under such conditions, the natives of the southwest drive at night to foil calorific Sol. In the higher altitudes, between Santa Fe and Kingman, the heat is not oppressive during July and August but as you approach nearer to sea level, you harbor the conviction that you are located just above one of Satan's hottest blast furnaces.

When to Tour Lincoln Highway

Because of the extreme heat in the low altitudes of the southwest during July and August, the more northern routes—the Lincoln highway and the Trans-Colorado roads—are preferable in mid-summer. They are seasonable from June 1, when the roads have weathered the drenchings suffered during the spring rains, to October 1, after which there is danger of snowfall in the mountains. Although the permanently improved roads east of the Mississippi river probably will be in shape

for travel as early as April 1, it would be folly to attempt to cross southern Illinois, Iowa, Nebraska and Kansas before the middle of May at the earliest. March and April rains doubtlessly will make the dirt roads in these states impassable unless we enjoy an exceptionally early spring, and the wise motorist will not endeavor to travel them until the rains are over and the highways have a chance to settle and the farmers have

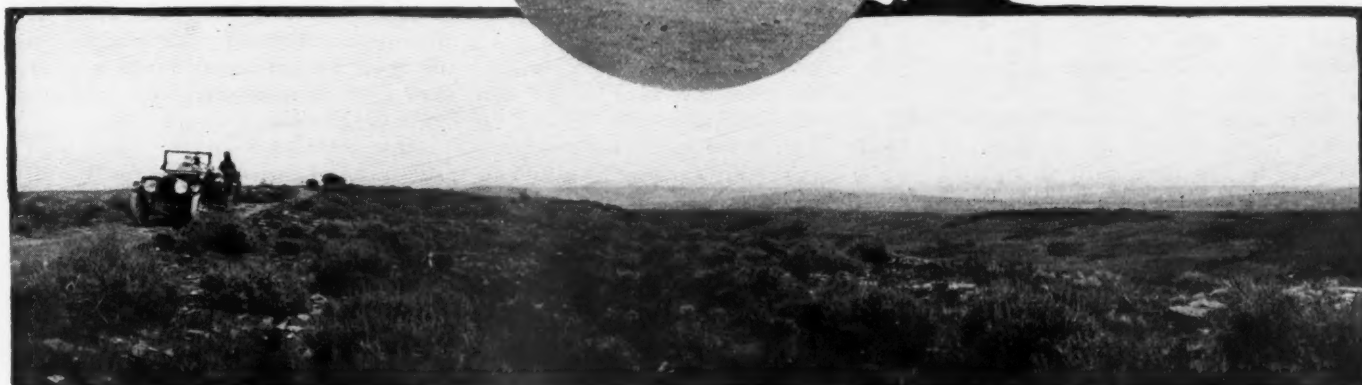
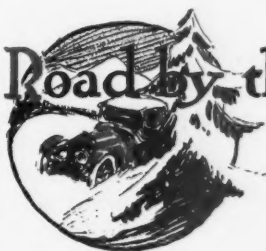
Judging the Road by the Calendar

WHEN to make the 'Frisco tour is a question almost as widely discussed as that of which roads to take and to give a comprehensive, all-satisfying answer is about as difficult as to specify the preferred highways. The several ocean-to-ocean routes extend over such a great length of territory, where it may be wet and dry or cold and warm in different sections at the same time, that it is almost impossible to specify when each trail is the most seasonable.

Broadly speaking, the Borderland route, with its eastern terminus at Washington and the Mississippi river control at Memphis, is the all-year-round route since it traverses a region where there is little or no snowfall and where the coming and going of the four seasons causes but slight fluctuations in the mercury tube of the thermometer. During the rainy season, tourists will have some difficulty traveling over the roads, which are natural dirt trails practically all the way but as the

occasional heavy rains, which sometimes are torrential, come during July and August and because of its southerly location and the

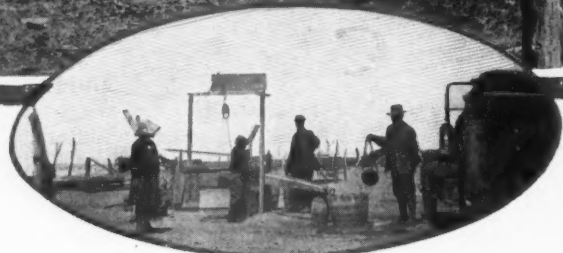
absence of high mountain passes which often are impassable because of snow, the Borderland route, with its feeder, the Gulf States highway, is the extreme winter road.



UPPER ILLUSTRATION—RESIDENTS OF A FRONTIER TOWN OF WYOMING PAYING THEIR RESPECTS TO TRANSCONTINENTAL TOURISTS. LOWER ILLUSTRATION—A TYPICAL SCENE IN WYOMING, SHOWING THE SAGE BRUSH, THE ROLLING PLAINS AND THE MOUNTAIN RANGES IN THE DISTANCE



UPPER ILLUSTRATION—THOMPSON'S RANCH IN THE GREAT AMERICAN DESERT. CENTER ILLUSTRATION—THE FRONTIER BLACKSMITH SHOP ALSO SERVES AS A GARAGE ON THE PLAINS. LOWER ILLUSTRATION—FILLING WATER BAGS AT DESERT WELL



worked them with drags.

Travel under the most favorable conditions on the two most northern routes, the Northwest trail and the Black and Yellow trail, is limited to 2 months, July and August, since these highways cross states that generally have a late spring and an early fall. Muddy roads in the Dakotas and snow-blanketed prairies in northern Wyoming and Montana in June are common and in September and October, when the states to the south are veiled in the smoky mist of Indian summer, the residents of the central northwest daily anticipate a welcoming blast from Medicine Hat.

Round Trips and the Ideal Tour

Variety is the spice of touring as well as the spice of life, as some Reno divorcee or the father of vaudeville once remarked, and the prospective transcontinental motor tourist should bear this adage in mind in charting his trip to California. Don't travel one route in both directions. Drive over one highway on the westward trek and return by another. There are a number of round trips of interest and profit that can be planned to suit the individual sight-seeing desires of persons of several different tastes. If you prefer mountain scenery, travel through the Rockies. If you wish to live temporarily in Spanish atmosphere and to see the most picturesque of the American Indian tribes in their most primitive and unspoiled state, tour in the southwest. If you seek the plains made famous by General Custer and Sitting Bull and the cow country of the pre-circus days of Buffalo Bill, cross Nebraska and Wyoming on the Lincoln highway.

The ideal tour from New York to San Francisco and return, according to the writer, can be outlined as follows: Pro-

vided you start in June or July, follow the Central New York-Lincoln highway route as far as Cheyenne. Leave the memorial road here and go north through Douglas, Casper, Basin and Cody to the Yellowstone National park. Abandon your car and spend a week in this wonderland of geysers. Return to Cheyenne and continue south through Denver to either Colorado Springs or Pueblo. Take one of the roads leading through the Rockies, the Pike's Peak highway from Colorado Springs or the Rainbow trail from Pueblo, and roam in the purple shadows of the snow-turbaned peaks. Pick up the Lincoln highway again at Salt Lake City and from the fascinating mecca of the Mormons, proceed to San Francisco by either the southern route around the Great Salt Lake or by way of the Overland trail.

The Road to the Missions

After you have had your fill of the Panama-Pacific exposition, take to the road again and drive down the historic El Camino Real, or the Pacific boulevard, the string on which Fra Junipero Serra and his Franciscan brothers hung their rosary of missions, to Los Angeles and San Diego. Here is another world's fair to hold your attention for at least a week. Then don your duster and goggles once more and beat back on the shoreline road to Los Angeles. Follow the National Old Trails westward. Experience the thrill of the pioneer and the prospector as you dash across the Mojave desert at the southern end of romantic Death Valley, the rain-

bow's end of reality where "Death Valley Jim" Scott and other adventurers of lesser fame found the proverbial bag of gold. Detour at Williams to the Grand Canyon of the Colorado, the most stupendous and inspiring sight in the world, a great chasm of lofty peaks, turrets and minarets of restlessly changing color, a breath-catching wonder that defies description even when description is attempted by the master worker with the superlative adjective.

West of the Grand Canyon on the National Old Trails highway, you will pass by the petrified forest and over the rainbow-tinted sands of the painted desert. At Holbrook, there is a worth-while detour north into the Hopi Indian reservation, the camping ground of the snake-dancing Moquis. Plan to stop at Santa Fe for 3 days at least or you will not have time to visit the terraced houses of the Pueblos at Taos and Santa Domingo and the cliff and cave dwellings of primordial man on the Pajareita plateau and at Pecos, each only a short drive from the most ancient and exotic city in all America.

On the Santa Fe Trail

After leaving Santa Fe and on the drive across Kansas over the historic Santa Fe trail, you will follow in the wake of the canvas-canopied prairie schooners that creakingly bore their loads of bullion across the Indian-infested plains less than a century ago when the American trader was a red-blooded adventurer, a gambler, a chance-taker. Missouri also has its historic attractions, landmarks associated with the intrepid deeds of Daniel Boone and his sons and senile, weak-kneed inns where the keeper was cook, waiter and fiddler in the days of stage coach travel, proud old caravansaries on the floors of which the Money Musk once was danced but some of them yet offering accommodations to the new school of dancers, the experts at the maxixe and fox trot.

Travel over the macadam, concrete and gravel roads of Indiana and Ohio and follow the National Old Trails as far as Hagerstown. At this point detour to Gettysburg, if you never have visited the scene of the most decisive battle of the civil war, and in memory ride with Pickett across the red field or stand with Hancock on Seminary ridge from the crest of which a death-dealing fusillade of shot and shell silenced forever the wild rebel yells of gray-coated heroes.

And when you reach Cohan-lauded Broadway, hemmed in canyonlike with architectural cliffs, I will wager that you will exclaim "Some trip!" or voice an equally succinct expletive of satisfaction and roll in between the sheets of your own four-poster with a sigh of contentment.

The mention of sheets and four-posters aptly introduces another subject of interest to transcontinental motorists, that of hotel and garage accommodations, especially in the sparsely settled regions west

of the Missouri river. Having taken a poll of the hotels and garages established in the main towns and cities on the three preferred routes, which is printed in detail on pages 28, 29, 30 and 31 of this issue, I feel safe in stating that no tourist, giving any thought at all to his itinerary, will be compelled to go hungry or have to qualify as a sport by "sleeping in the street." Neither will it be necessary to park the car alongside the road for the night. All cities and towns affording hotel accommodations for motorists are well supplied with garages where machines can be stored and gasoline, oil, tires and other equipment purchased.

Carry Lunch on Desert Drives

If any difficulty is experienced in securing food, shelter and supplies on any of the broad red line roads, it will be in the arid region west of Salt Lake City on the Lincoln highway and in the desert country between Kingman and Barstow on the National Old Trails highway. On the 292-mile drive from Salt Lake City to Ely, Nev., and across 70 miles of the Great American desert, there are six intermediary stopping places where supplies can be obtained and accommodations secured, namely: Grantsville, 41.7 miles; Iosepa, 30.1 miles; Orr's Ranch, 16.7 miles; Fish Springs, 59 miles; Ibapah, 46.6 miles and McGill, 84.6 miles. From Ely, Eureka is only 85.8 miles distant and Austin is 71.5 miles farther on. There are two towns, the California Needles, 62 miles west of Kingman, and Ludlow, 51.2 miles east of Barstow, that will serve either as noon or night controls on the 237.8 miles of traveling the desert which extends from Kingman to Barstow. Before starting to cross these arid stretches, the tourist should provide lunches for himself and the members of his party and take on an extra supply of gasoline, oil and water to be prepared for any emergency or breakdown in an isolated region several miles distant from a settlement.

With the exception of these two extremely arid and uninhabited stretches, there is no transcontinental route of any importance that has not towns and cities on it at an average maximum distance of 50 miles. The smaller towns of 1,000 and 2,000 inhabitants can boast of hotels the equal of those in the middle western and eastern cities of ten times greater population. Motorists going to the coast at the

height of the touring season, however, are advised to make hotel reservations in advance in the country west of the Mississippi.

Where Mechanics Are Gamblers

Even in the more isolated regions, there is a surprisingly large number of garages. The blood that flowed through the veins of the gamblers of the early days, when tents were pitched in California to house faro and roulette layouts during the gold rush of '49, is the heritage of the western repairmen and mechanics. They are building temporary garages on the main transcontinental highways, trusting to make their pile on the money collected from 1915 tourists alone and planning to abandon their crude shacks when the California-bound fever abates.

There is absolutely no reason for the motorist to carry camping equipment or to anticipate spending a night out of doors. Many tourists, desiring to fish or hunt en route and to whom roughing it appeals, will shun the hotels but they will do so from choice and not because of necessity.

Time may be money, as the adage runs, but nevertheless, the transcontinental motorist is advised to be a spendthrift with the golden hours and to be as prodigal with his days on the road as the coquette is generous with her amorous glances. The leisurely tour will prove to be the most enjoyable and least arduous tour. "The object of the journey is not only to reach

and rolling country with the speed reduced to 150 miles a day while driving over the mountains and across the deserts.

The Premier ocean-to-ocean tourists of 1911, the first large party of motorists to attempt a transcontinental trip, spent 45 days on the road between Atlantic City and Los Angeles. This seems both a generous and sane time allowance, since it affords ample opportunity to make the several side trips to places of scenic and historic interest and does not make imperative long runs day after day which are as tiring to the passengers of a car as they are to the driver. If you can devote 2 months to the trek, 1 month for the westward and 1 month for the eastward journey, the tour should be a delightful and profitable one. Whatever you do, plan to spend more time on the southern route than on the northern roads for there is far more to see on the National Old Trails highway, especially in the southwest, than there is on the Lincoln highway.

No Chance for Bankruptcy

Transcontinental touring is not a sport in which only millionaires can afford to indulge. If men of wealth wish to be exclusive in their pastimes, they had best stick to polo, racquets and auction bridge at \$1 a point. Driving to the coast will not bankrupt the man of average means. It is not an expensive undertaking. Three dollars per day per person probably will

cover all costs except tire expense and \$4.50 per day per person is a most generous allowance. The latter estimate is based on the expenses of the forty motorists participating in the Premier ocean-to-ocean tour 4 years ago. Each member of the party was assessed \$230, making a total of \$9,200, \$2,000 of which was spent for camping equipment, which never was used, and for its shipment by express. The remaining \$7,200 covered



SCENIC CANYON DRIVE AMONG THE MOUNTAINS OF THE SOUTHWEST

the goal but to find enjoyment on the way." The purpose of the California trip should not be just to get there but to see much while going. The tour, from ocean to ocean, has been made in 14 days by aspirants for the transcontinental record but this time is far too fast for the average driver to attempt. The trip from New York to San Francisco could be made in from 19 to 21 days and from the Mississippi river points in from 12 to 14 days but this would require fatiguing runs of approximately 200 miles daily in the flat

all the expenses of the party for 45 days, including hotel bills, meals, purchase of gasoline and oil, storage for cars, cost of tire repairs and some entertainment—side trips and several theater parties. In the large cities, the tourists stopped at the most exclusive hotels—at the Willard in Washington, the Claypool at Indianapolis, the Congress at Chicago, the Brown Palace at Denver and the St. Francis at San Francisco—where the livery of the doormen and the lordliness of the waiters is most awesome. Two simple problems in

division, dividing \$7,200 by 40 and that quotient by 45, gives the per day per person expense, \$4. This is a trifle low to estimate the expense of occupants of single cars since the party secured a special rate of \$4 per day at the \$5 per day hotels, but an addition of 50 cents per day per person will cover the difference in hotel bills.

Campers Will Spend Even Less

If the transcontinental motorist camps en route, the cost of the trip will be even less. If no hotels are patronized from one end of the trip to the other, the per person per day expense will not be more than \$2.50 and should the tourist camp only about one-half the time, \$3.50 will cover the daily expenses of each person in the party. These estimates are based on expenditures made by John Guy Monihan, general manager of the Marion Motor Car Co., and a veteran transcontinental motorist, who, on a recent 5,000-mile tour, covering 60 days and with five persons in the party, spent a total of \$1,024. This included the cost of the camping outfit, \$100, and all other expenses with the exception of tire purchases.

"Is it safe to tour in the west?" is a question that several readers of *Motor Age* have asked in writing for touring information. One reader, believing that it is not, offered the suggestion that the government use the federal troops to patrol the highways in the isolated sections of the western states through which the main ocean-to-ocean routes pass. Personally we believed that the west is no longer a bad lands terrorized by road agents and bandits except in the movies, and even if a few aspirants for the notoriety of the James boys ride through that country, we would rather take a chance of looking into the business end of a western holdup man's revolver than have a Chicago footpad sneak up behind us and crown us with a sandbag, but to gain an authoritative answer as to the safety of touring in the west, we passed the question on to the adjutant generals of the several western states and their replies, given in part below, are most reassuring.

"You may assure your readers that motorists may pass through Utah with quite as much safety from highwaymen and road agents as they enjoy in any other section of the United States," is Governor Spry's answer. "The suggestion that the militia be detailed to patrol the isolated sections is absolutely foolish and all trans-

continental tourists may feel sure of passing through Utah without molestation at the hands of road agents."

Harry T. Herring, adjutant general of New Mexico, writes as follows: "There is not the lawlessness in this state that the ordinary eastern man assumes and the old days of holdups have passed as far as New Mexico is concerned at least. There are two main arteries of transcontinental motor travel through this state, the National Old Trails highway, which comes into the state at Raton and goes out west

the larger towns. Our state for the past year has been making arrangements to take care of the tourist travel. Along the routes the hotel accommodations and garage facilities in most of the larger towns have been improved to such an extent that there is very little likelihood of any serious mishap in making such a trip."

Arizona Synonym for Safety

"Tourists are safer in Arizona than in any of the eastern states," writes Adjutant General Charles W. Hams. "I feel sure that tourists passing through Arizona will be surprised at the absolute lack of lawlessness in this western state."

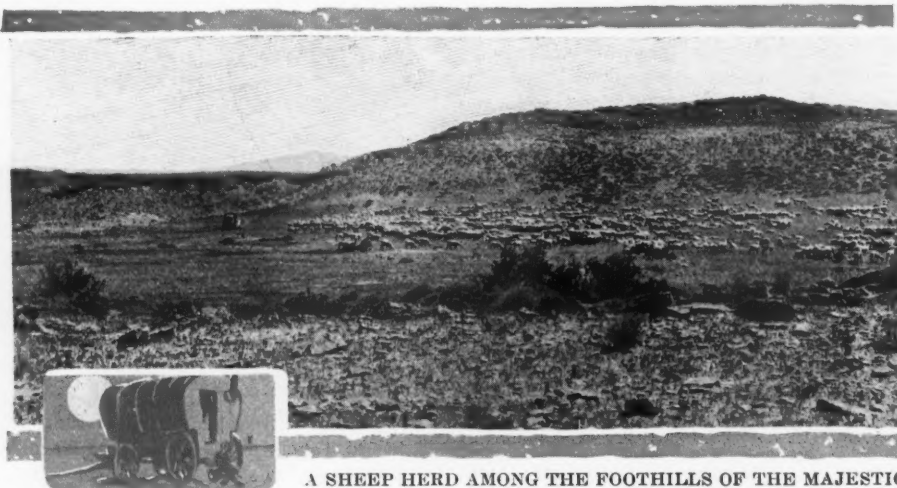
"The state of Nevada is known for its order and freedom from highway robbers and I can assure your readers that all they can expect in their tour through this state is to meet with western hospitality and every courtesy from the inhabitants along the lines of travel," is Adjutant General Maurice J. Sulli-

van's reply to *MOTOR AGE's* letter.

"The further you get away from the east, the more secure you will be from holdups," is the declaration of George M. Sliney, adjutant general of Wyoming, "and the center of the safety zone will be in that part of Wyoming where you will begin to meander around the spinal column of the American continent."

So much for personal assurance of the tourist's safety. If you feel that you are out of luck and convinced that you will be among the few motorists that will be stopped by a lone and daring road agent, carry only a small amount of currency with you and have the greater part of your touring funds in traveler's checks. Should you meet a highwayman, the joy of bragging over the unique experience will be worth more than the price you pay. Don't arm yourself for any such emergency. Western men are born with their first baby finger on the trigger of a six-shooter. And here endeth the first lesson on the safety of the west, a country grossly misrepresented by the authors of the "Broncho Billy" and other film scenarios of the nickel-awful type, for the special perusal of the eastern tenderfoot.

Transcontinental travel has been robbed of its early terrors and the chances of breakdown reduced to a minimum by the spread of the good roads propaganda through the west and southwest. No longer is it necessary to overload the car with paraphernalia as on the similar tour of a decade ago. Travel as lightly as possible. Every ounce of extra weight



A SHEEP HERD AMONG THE FOOTHILLS OF THE MAJESTIC ROCKIES IN WYOMING

at Datil, and the Southern National or Borderland highway, which comes into the state east of Tatum and goes out west of Lordsburg.

"On the first mentioned, from Raton to Albuquerque, the road passes through a thickly populated community and parallels the railroad all the way. From Albuquerque to Socorro, there is a stretch of about 60 miles which leads away from the railroad but passes numerous ranch houses and from Datil west there is about 50 miles of road with only a few ranch houses along the route.

Out of Mexican Bullet Zone

"On the southern highway from Tatum to Roswell, a distance of about 75 miles, there are possibly a half dozen ranch houses. From Roswell to Carrizozo is a thickly settled section and from Carrizozo to Alamogordo, the route parallels the railroad. From there on to El Paso, the route leaves the railroad and the country is sparsely settled. From El Paso on to the west line of the state, the road parallels the Southern Pacific and passes through well-settled communities. In no case, with the exception of the 12 miles out of El Paso, does this route come within 25 to 30 miles of the international boundary.

"I can assure you that there is no more chance of holdups in New Mexico than there would be in Illinois or any of the eastern states.

"The above mentioned motor routes have been thoroughly posted and the signs in all cases indicate the distance to

that you carry will only add to the strain that your Ford or Packard must withstand on the long trip.

Guard against disaster en route by inspecting your car before you start. Examine the brakes and steering mechanism and take up any play in loose parts. Have the carburetor and magneto properly adjusted and the speedometer checked up for accuracy. The purchase of six oversized casings, four for immediate use and two to be carried as spares, will minimize your tire troubles on the road and should carry you through to California without additional investment in Para rubber. A radiator thermometer, a tire gauge, a road vulcanizing outfit and a motor pump are not imperative equipment, but if you have them with you they may save much time and energy and check occasional outbursts of temper.

Emergency Equipment Necessary

In addition to tire chains, extra tubes and the small vital parts—spark plugs, bearings, etc.—for replacements, the transcontinental touring equipment is not complete without a small folding spade, hand ax and a block and tackle, the latter preferably of wire cable and steel blocks. You may never be forced to unpack either the spade or the block and tackle, but the cautious motorist will carry them for the remote emergency and use them in getting his car out of the sand. The terrors of desert travel, in fact, are greatly exaggerated and any car will pull through the worst sand if the tires are deflated to about 30 pounds pressure, the deflation giving a wide, flat surface that does not dig in. The hand ax will be regarded as an asset of great value should the motorist, marooned in an isolated region, wish to cut some wood or mesquite for a fire.

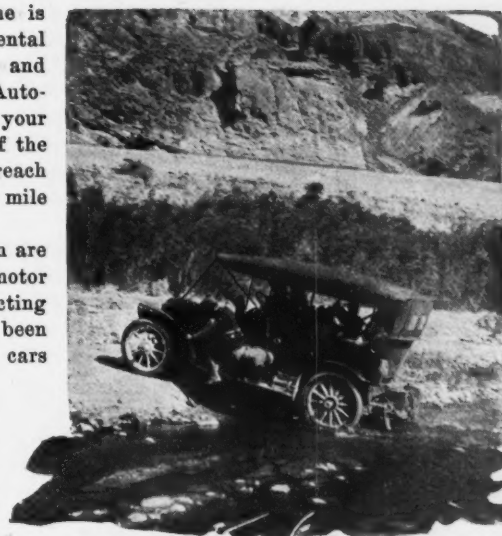
Three other pieces of emergency equipment are two 2-gallon African water bags, one to carry water for drinking purposes and the other water for the radiator; blankets and a supply of food. The water bags should be filled before crossing the 20-inch annual precipitation line, drawn on the supplementary map approximately 200 miles east of the Rocky mountains, and further indicated by the red arrows, as the region beyond is arid and on some stretches of road the wells are a long distance apart. Although blankets are bulky and take up room, they will keep the motorists, stalled for the night in the high altitudes, warm as they lie on the ground and fall asleep to the lullabies of distant coyotes. A raid will be made on the grub box should you be out of hearing of the dinner bell of a ranch house or small town hotel in a sparsely populated region, and it is best to keep it well filled. The best emergency provisions are cans of baked beans, which can be eaten cold or warmed over a fire in the tin, and crackers.

When Mark Twain traveled west in a stage coach on the Overland trail, he carried Webster's unabridged dictionary to

keep him company. This heavy tome is not recommended for the transcontinental tourists of today. A more valuable and less heavy piece of literature is the Automobile Blue Book. With Volume V in your lap while crossing the country west of the Mississippi river, you are certain to reach your destination without driving a mile out of the way.

Common sense, foresight and caution are needed far more on the ocean-to-ocean motor tour than extra rear axles and connecting rods. Transcontinental tours have been made time and again in the past by cars carrying no more equipment than they would have in running about town. The drivers drove cautiously, however, and knew how to pick the roads. This does not mean that they made slow time. On the other hand, they did not attempt high speed in the western country, where the contrasts are not sharp and the unforeseen occurs very suddenly.

Perhaps there is no region on the main thoroughfares where cautious driving is more of a requisite to a successful journey than in the southwest, on either of the two red routes out of Springerville, Ariz. On the National Old Trails highway there is one drop of 2,000 feet in 20 miles between Williams and Ashfork, and another drop of from 2,000 to 3,000 feet in the next 20 miles. The tourist starts across the desert at Kingman, and at Needles, 72 miles farther west, should be sure to take on supplies, as there is no stopping place for more than 100 miles. Incidentally, the Colorado river is crossed at Needles on the railroad bridge, which has been planked and is being guarded at either end. The toll is \$3.50. There are 10 miles of difficult driving in the descent of Cajon pass in the San Bernardino mountains, the road for 10 miles being narrow, winding and steep, and the grades exceedingly severe.

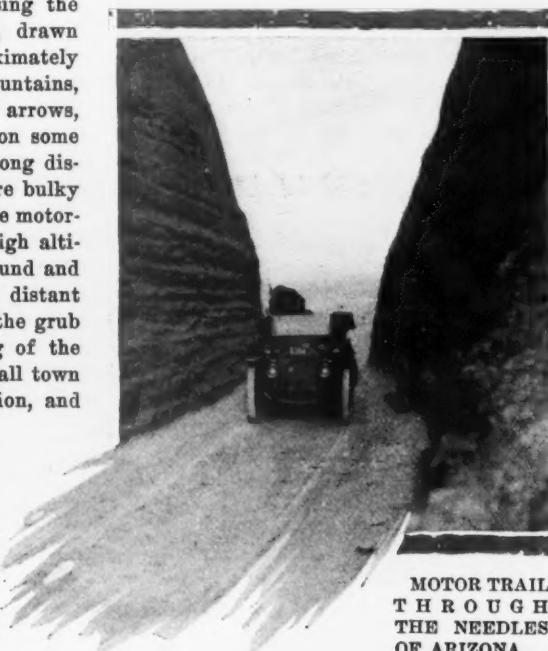


CROSSING A WASH IN THE MOUNTAINS OF NEW MEXICO

The Ocean-to-Ocean highway has a longer stretch of desert country than that which marks the tour on the National Old Trails highway between Kingman and Barstow, and 59 miles west of Yuma is the feared and noted Mammoth Wash, a 4-mile expanse of sand dunes that shift 75 feet a year. The trip across this restless piece of topography is not as terrifying as the drivers of mule teams, who charge \$10 a car for hauling, pretend in order to increase their annual revenue. The tourist who lets the air out of his tires before attempting the trip will save \$10 and reach less temperamental land in safety. Recent advices from the southwest warn motorists from taking the Ocean-to-Ocean highway between Springerville and Globe before May 1, as the roads have suffered from washouts. After this date, moreover, ferrying across the Colorado river at Yuma will not be necessary, as the new bridge will be open then.

Unless you wish to enrich the California cleaners, send the greater part of your clothes by express and carry only one suit or dress for wear at stops en route, because the majority of dustproof trunks are not as dustproof as the salesman claims. A gray or mixed black and white suit or dress will prove most serviceable for wear while driving, as it does not show the dirt as one of black or blue, and is much cooler. Two outer garments, a duster and raincoat, are needed. For driving in the rain, a rubber coat or oilskin slicker will protect the wearer more than a garment of alleged waterproof fabric. One very important part of the tourist's personal equipment is a pair of goggles or driving glasses. Get good lenses of a light amber shade and be sure that the goggles fit the eyes and face.

Cold cream and talcum powder should not be forgotten in making out a list of the articles to be taken on the tour. An application of cold cream on the face before going to bed at night will be a partial protection against sunburn, while tal-



MOTOR TRAIL THROUGH THE NEEDLES OF ARIZONA



MONUMENT TO FATHER SERRA BUILT AT SAN DIEGO OF ADOBE BRICKS DISCOVERED ON SITE OF OLD FORT

cum powder is most soothing to the skin after a long drive in the wind and dust. Use soap and water on the face only at night. Merely rinse the face in cold water upon arising and during the day; use a piece of chamois for removing the dirt, as the oils in it keep the skin soft. Shave just before going to bed and not in the morning. The skin is very tender after being scraped with a razor, and unless it has a chance to toughen before the start of a drive, will become raw and painful. Don't chew gum in crossing the arid regions, as the chicle absorbs the saliva and the dry mouth, combined with the alkali dust, intensifies the thirst and irritates the throat. Be sure that the water you drink and carry for drinking purposes is pure. Boil it while in the desert regions, where the wells are filled with alkali. You need not carry medicines. Fresh air and sunshine are the greatest of alchemists and guarantee perfect health.

Points of scenic and historic interest directly on the main routes are too myriad for specific enumeration. There is no state so historically impoverished that cannot boast of several consecrated spots—landmarks of the pioneer days, battlefields where red-skin and paleface met in hand-to-hand combat, ancient

dwelling where famous statesmen and warriors once resided. There are, however, a number of places of national and international fame that should be visited by the California-bound tourist, all of which can be reached only by detouring off the preferred ocean-to-ocean highways, and which should receive at least a paragraph in mention in an article of this character. Such information can be briefly tabulated as follows:

Yellowstone National Park—There are two feeders from the Lincoln highway. One starts at Cheyenne and goes diagonally across Wyoming for 521.3 miles through Douglas, Casper, Thermopolis, Basin and Cody. The other starts from Salt Lake City and goes north through Ogden, Pocatello, Blackfoot and Idaho Falls to the western entrance to the park. The former is the better road.

Glacier National Park—Reached by detouring off Lincoln highway at Cheyenne and traveling over feeder to Yellowstone National park as far as Cody. From here go north to Billings and from there follow the Northwest trail to Missoula, the southern terminus of the feeder road through Kalispell. Total distance, 1,161.5 miles.

Lake Tahoe—Only 14.9 miles south of Truckee, Cal., on the Lincoln highway.

Garden of the Gods—Fourteen miles from Colorado Springs. Latter point can be reached by Lincoln highway tourists by detouring either at Julesburg or Cheyenne through Denver. Julesburg detour totals 276 miles, while Cheyenne detour is 99 miles shorter. Can be reached by National Old Trails highway travelers by feeder roads from LaJunta and Trinidad which converge at Pueblo. The Trinidad-Pueblo highway, the preferred route, measures 107 miles as the LaJunta-Pueblo detour to Colorado Springs is 26 miles longer.

Grand Canyon of the Colorado—North of the National Old Trails highway, 71.5 miles by the Flagstaff detour and 63.4 by the road from Williams. Tourists are advised to travel both routes, one going and the other returning.

Taos Pueblo—Seventy-five miles north of Santa Fe, N. M.

Battlefield of Gettysburg—Directly on Lincoln highway. Can be reached from National Old Trails by detouring 34.2 miles northeast from Hagerstown, Md.

There is one more suggestion to the transcontinental tourist. Read before you go. The trip will be much more enjoyable, much more profitable if you know something of the history of the country through which you pass and the romance that hovers over the old trails on which you leave the imprint of your tires. There are several splendid histories of the Santa Fe and Overland trails, written by pioneers who trod them. Agnes Laut's "Our Unknown Southwest," a delightful description of the Santa Fe trail of the old days and of the pueblos and cliff ruins of New Mexico, reads like a novel, and Ger-



MISSION BELLS AT THE OLD TOWN OF SAN DIEGO, BROUGHT BY THE FRANCISCAN FRIARS FROM SPAIN

trude Atherton has just completed a vividly picturesque and intimate history of California. These are only a few of the many books the perusal of which will add to the pleasures of the prospective trek.

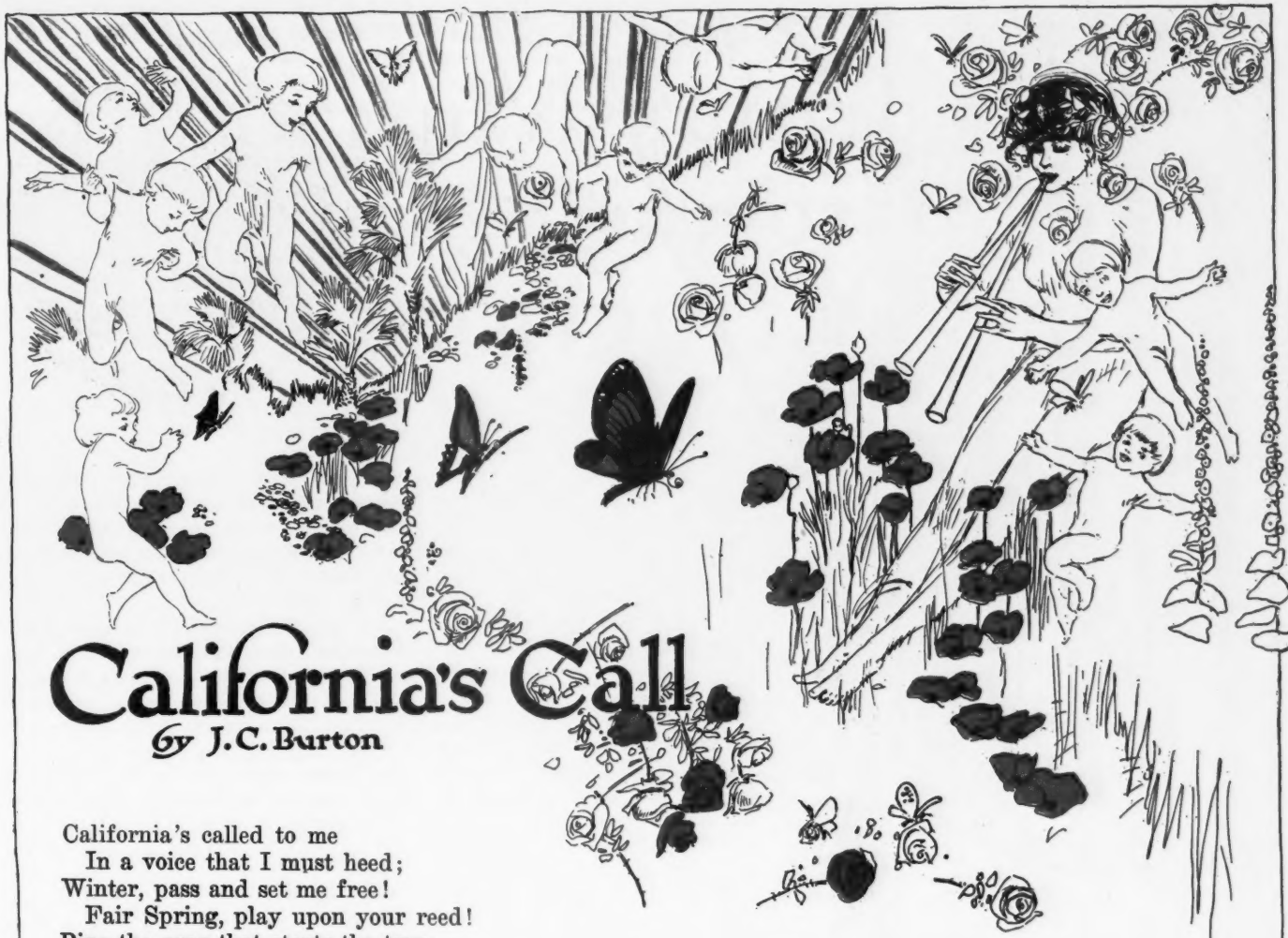
The panttechnicon pilgrimage to California is the apotheosis of all motor migrations. It offers an opportunity to travel the most improved and interesting trails in the country. The tourist taking advantage of such an opportunity will see much of America in a comparatively short time. On reaching his destination, he will be in a land that captivates, a land of myriad charms. He will exude good health. His appetite will be the biggest cargo he carries.

At San Francisco and San Diego, in the dazzling brilliancy of the two expositions, east and west will meet in joyous festival. Motors will throb and horns will sound a blast of triumph. The thousands of motorists, who head California's call, will have no cause for regretting the tour.

Down at my favorite cabaret cafe there is a Titian-haired vocalist who sings "California and You" with much feeling. I guess I will go down and hear her now. When she hits the high notes, I know that I will envy you in your impending joys.



STOPPING TO MARVEL AT THE TERRACED HOUSES OF THE PUEBLO INDIANS AT TAOS, N. M.



California's Call

By J.C. Burton

California's called to me
 In a voice that I must heed;
 Winter, pass and set me free!
 Fair Spring, play upon your reed!
 Pipe the song that starts the tour,
 Pipe me to the open road,
 Where in pleasures I'm secure,
 Where I roam by gypsy's code!

California's call is low,
 Like a mother's lullaby,
 Yet it carries 'cross the snow—
 Turbaned sultans of the sky;
 Carries 'cross the prairie lands,
 Where the trails were once stained red;
 Carries 'cross the desert sands,
 Strewn with dust of things long dead.

California's call is sweet,
 Like the perfume of the rose,
 Bidding me to life replete
 With the joys the wand'rer knows;
 Bidding me to break the thongs,
 With which Winter bound me fast,
 When December howled his songs
 To the north wind's trumpet blast.

California's call is clear,
 Like the martial bugle's note;
 "Leave," she says, "the regions drear,
 'Time is fleet,' so Omar wrote;
 April walks with lagging feet,
 May will dally on her way;
 What care you for rain and sleet?
 Don't put off but start today."



When she calls I close my eyes,
 Like some lover in a dream—
 'Fore me purple mesas rise—
 I am camping by some stream
 Where the eager, speckled trout
 Wait to dangle from my rod;
 All my woes are put to rout
 And I answer with a nod.

California's called to me
 And I can't resist her call;
 To her outstretched arms I'll flee,
 No more am I Winter's thrall;
 Mountain peak and arid plain
 Are not things to terrify;
 Hark! Is that her voice again?
 She is calling me. Good-bye!

California's Myriad Motoring Attractions



of the Pacific are scattered into fountains of spray.

Don't attempt to dispute him. It is useless. The true Californian will back California with his last white chip. The blue sky, which smiles on his state almost the year 'round, is his limit. When it comes to the call and show down, he probably will rake in the pot. Surely, he has a hand that calls for table stakes play.

Stage for Romantic Drama

California is something more than an expanse of mountain, valley and desert. It is romantic drama acted on a stage of wonderful natural settings. It is the ideal destination for a transcontinental tour, the logical starting point for the seeing of America first. Opportunities for sightseeing are myriad. It can boast of a network of macadam and concrete-asphaltum boulevards that lead to historic landmarks of absorbing interest and scenic places that are awe-inspiring in their grandeur. Moreover, California's charms are different from those of other commonwealths. It is a state of distinct individuality. It is America mixed with Spain and the orient; it is a blend of people, scenery and history that is both heterogeneous and harmonious.

To appreciate the California of today, you must know something of the California of yesterday, something of its restless history and of the picturesque adventures that suffered tortures to settle there. Measured in years, California's story is not long but on almost every page there are tales of blood and courage, of hope and suffering, of herculean endeavor and titanic achievement. California's history is not drab. It is as colorful as a novel. It is a movie film with a thrill every inch, a film that starts with the weary march of the Spanish conquistador and Franciscan friar and ends with the towers, domes and minarets of two expositions flooded in light. The music, incidental to the picture when the film is thrown on the screen, must have notes representing the toll of mission bells, the tinkling

of the Mexican vaquero's mandolin, the whoops of the gold-seekers, the creak of the scaffold when the vigilantes spring the trap and the crash of falling buildings and the roar of hungry flames as the earth rumbles and cracks.

So rich is California in natural scenic attractions that the two artificial ones, the Panama expositions at San Francisco and San Diego, seem almost superfluous yet they will prove the two most powerful magnets in drawing eastern tourists to the Golden state during the impending spring and coming summer. Since I favor the conservation of superlative adjectives, I will make no attempt to describe the beauties of these two magic cities that have been built in the province of perpetual fete and will give only passing mention to the twin world's fairs of 1915, one a "vision of ivory and gold" and the other "a bit of old Spain nestling at the base of lofty mountains."

Nature's Wonderful Contribution

Centuries ago, long before the soldier and padre of Aragon dreamed of territorial and spiritual conquests in a new world across the Atlantic, Nature contributed scenic wonders to the beauty of California that the hand of man cannot duplicate. To tour the Golden state without looking upon them, without marveling at their grandeur, is to miss half the delights of the long journey across prairie, mountain and desert. When you have seen the expositions, seek out these majestic shrines and claim your mite of the heritage left by earthquake, flood and erosion. View the scenes in the wonderful geological drama that was written aeons ago by the hand of God.

The Panama-Pacific exposition is not the only place to visit within the corporate limits of historic, plucky San Francisco. You can spend a day most profitably in driving about the Phoenix city and its environs. There are the mysteries of Chinatown, with its pagoda towers and swinging lanterns and tattered bulletins of the Tongs, to explore. On Portsmouth square is a shaft, surmounted by a careening galleon, "to remember Robert Louis Stevenson," the English author who chose California as his adopted land for

THE residents of several states claim that theirs is the motorist's true paradise. Ask the native son of San Francisco or Los Angeles, however, regarding the veracity of such claims and he will laugh disdainfully and declare that there is but one Eden—California—where the gasoline engine reaches the high note in its pulsating paean of absolute contentment.

Cataloging California's Attractions

He is ready to back up such an assertion, too. If you do not break away—he cannot be interrupted—he will talk for hours and entertainingly of his land of sunshine and suffragists, oranges and optimism, ranches and redwoods, palm trees and poinsettias, beaches and boulevards, peaks and pugilists, taverns and tourists, missions and motor cars. Then, without gasping for breath, he will enumerate the scenic wonders of his state, noted for its geologic and historic restlessness; tell of the glories of the Yosemite valley, the Mariposa grove of big trees, the Sequoia National park, Lake Tahoe with its vista of canyons and mountain peaks, Donner lake, Truckee canyon, Emigrant gap across the Sierras, Mount Shasta, Lassen peak with its belching volcano, and the Riviera drive among the missions and along the cliffs on which the blue waters

a time. At the corner of Market and Dolores street is the Mission of Sorrows. The adobe walls of the chapel, built in 1782 by Fra Junipero Serra, withstood the shock of the earthquake and were scarcely scorched by the flames. In a nearby cemetery, the only Catholic burying-ground in the community between 1776 and 1862, lie the dust of many of the state's most famous pioneers.

There is the park of the Golden Gate, once a waste of dunes and squatters but now a verdant recreation ground of the municipality. In the museum of natural history, relics and paintings, near the north edge of the park, are a collection of antiquities reflecting every period of California's varied life—the chaise of General Vallejo; spikes from the San Carlos, the first ship to cast anchor in the Golden Gate; pieces of medieval armor and the bell which tolled the news of California's admission into the Union.

To enumerate in detail the scenic and historic places in California that the eastern tourist should visit is an almost endless task and therefore I will attempt to point out only the most interesting of California's myriad attractions.

South of Oakland, just across the bay from San Francisco, is the home of Joaquin Miller. Here, on the site of General Fremont's camp, the eccentric Indiana poet lived for 25 years, during which time he planted 80,000 trees and erected towers to the memory of Fremont and Robert Browning and a pyramid for Moses.

Sacramento is the logical starting point for the 236-mile trip to Shasta Springs, at the base of Mount Shasta, the "perfect

peak" and according to the Indian legend, the first mountain made by the Great Spirit as proof of his supreme skill. It celebrates the union of the Coast and Sierra ranges and for centuries was the dividing mark between the French possessions on the north and the Spanish territory on the south. It rumbles at times, like a snoring giant, and some day may spit out molten lava in its waking fury. Two days of climbing are required to reach its snow-crested summit.

Red Dog and Roaring Camp

From Sacramento, Lake Tahoe is 121 miles east by the Folsom-Placerville road. Placerville was originally known as Hangtown because of a triple execution that occurred there during the days of the gold fever. A slightly longer but more traveled highway is that by way of Truckee. This passes the historic mining camps immortalized by Bret Harte, Red Dog and Roaring Camp, and through Emigrant Gap where the cliffs still show the iron spikes that supported the ropes by which the early pioneers lowered their wagons across the gorge of the river here. Below Truckee pass is Donner lake, where in 1846 the Donner party perished in the snow. Lake Tahoe is situated on the Nevada-California boundary line. It is noted for its changing color, its depth and its wonderful clearness.

Eighty miles east of San Francisco is Stockton, the gateway to Bret Harte's country and a logical control on the trip to the Calaveras grove of big trees, 100 miles further east. On the journey to the forest of giant sequoias, the motorist will traverse a region where the gold fever

ran highest during the wild days of '49 and past the sites of settlements now deserted but where once the miner, prospector, gambler and bad man held forth.

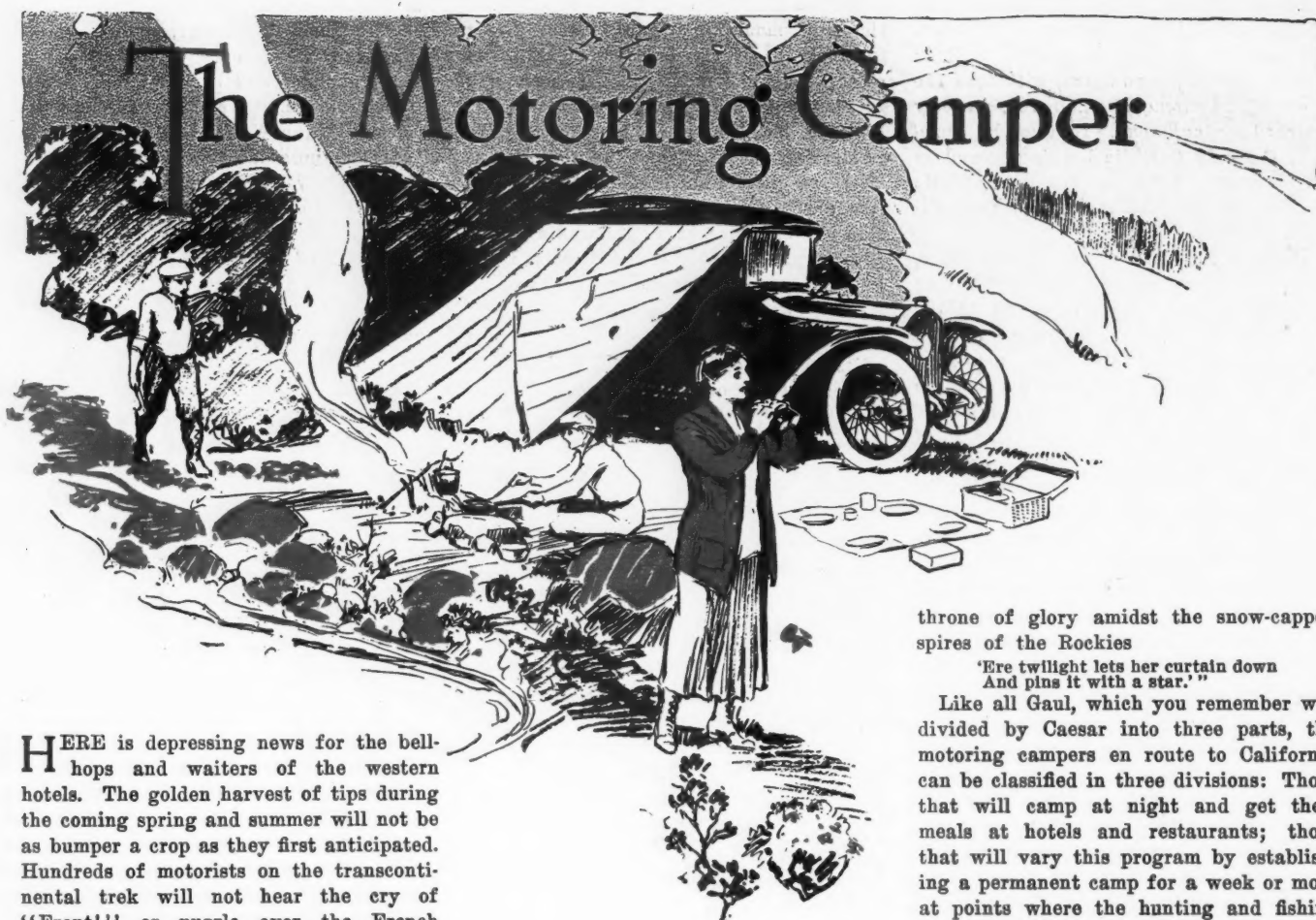
California's first wonder or foremost attraction in the Yosemite National park, about 250 miles southeast of San Francisco and now open to motor car tourists. This natural curiosity, a valley unlike any other valley in the world, lies on the west slope of the Sierras and measures about 6 miles in length and from $\frac{1}{2}$ to 1 mile in width. Here are great towers and domes of granite, tumbling water-falls and marvelous canyons.

The missions of California, founded by Fra Junipero Serra 150 years ago, are strung along the El Camino Real, or Pacific highway, all the way from San Diego north to San Francisco. Ravaging time has spared them. They are sacred relics of the past, heirlooms of adobe that marked the first settlement of the state by the Caucasians. They recall the days when Spain was supreme on the western shores of America. They tell a story of conquest by cross and not by sword. They are part of the Spanish atmosphere of California.

If you intend to make the transcontinental trip this year, prepare for it by reading something of this state of natural wonders and historic riches. A most instructive and entertaining guide book is "The Tourist's California" by Ruth Kedzie Wood. It is an excellently arranged Baedeker of this commonwealth of natural paradoxes and its perusal will make the visit to the expositions a holiday of pleasure and profit.



THE VALLEY OF THE YOSEMITE, "THE ONLY THING THAT EVER CAME UP TO ITS BRAG"



HERE is depressing news for the bell-hops and waiters of the western hotels. The golden harvest of tips during the coming spring and summer will not be as bumper a crop as they first anticipated. Hundreds of motorists on the transcontinental trek will not hear the cry of "Front!" or puzzle over the French dishes on the cartes des jours from one end of the journey to the other. As their autographs will not adorn the polyglot pages of the hotel register, their hands will be unstained by the ink of pens stuck in peeled potatoes or dishes of BB shot, but they may return to civilization with fingers blistered and burned at the camp fire. They will make the country west of the Mississippi their Romany and gypsy-like, camp along the road side.

Living the Life of Pioneers

At the end of a day's run these motoring Bedouins will shun the centers of population, pitch their tents in mountain ravines or on the lonely prairie and sleep out of doors. In the early hours of the morning they will be awakened not by the insistent ring of the hotel telephone but by the invigorating rays of a warm sun. Perhaps a nearby stream will provide fresh trout for breakfast, or the frying pan will be piled with chops cut from a mountain sheep shot the day previous. They will live as did the pioneers who followed the Overland and Santa Fe trails before them and Gosh, how they dread it! They can hardly wait until the time comes when they can start roughing it.

Life is very, very good under such conditions and the joys of the California tour increased. The pleasures of driving over the open road and living under the spell of the Great Silence can scarcely

be described, but George M. Sliney, a pioneer resident of Wyoming and former owner of a stage coach line, has attempted it.

"Get up in the morning in the crisp air of the early dawn," he writes. "Watch the glow of the morning sun drive from earth the gloom of night and bathe Nature in the beams of the morning, revealing to the naked eye the mountain peaks, more than 100 miles away, more clearly than you can see the tower of the Montgomery Ward building from the edge of Chicago. After breakfast, take a lunch and rod or gun, each according to his individual taste, and forgetting for a day the artificial existence of the east, get down to earth and commune with Nature in all its glory. See the country as it was laid out by the hand of God at the dawn of creation.

A Banquet for Epicures

"Return to camp in the evening, tired but happy and with your contribution for the bedtime meal—mountain trout or the meat of the elk, deer, bear or mountain sheep. You will enjoy such a supper as you never did in your life. You will wash it down with the purest water in the world, taken from a nearby spring. It is an after-dinner cordial that will appeal to your epicures and be relished by your Keeley-cures. Finally, before you go to rest, watch the sun setting in its

throne of glory amidst the snow-capped spires of the Rockies

'Ere twilight lets her curtain down
And pins it with a star.'

Like all Gaul, which you remember was divided by Caesar into three parts, the motoring campers en route to California can be classified in three divisions: Those that will camp at night and get their meals at hotels and restaurants; those that will vary this program by establishing a permanent camp for a week or more at points where the hunting and fishing is especially good; and those that will camp exclusively and prepare their own food daily.

Recommended Camping Equipment

The motorists dependent upon the hotels and restaurants for their meals will not be forced to carry as much equipment as the tourists who will be their own chefs en route. The cost of the camping outfit for the former class of gasoline-buying gypsies should not exceed \$100 and the following articles are recommended for a party of four or five persons: two balloon silk tents, 7 feet square and as high as the car top when up, as this is used as a ridge pole; four or five Gold Medal folding cots; four or five canvas bed rolls with pockets for luggage and clothing in the sides; and several light blankets, which are warmer than one or two heavier ones, for each motorist.

The balloon silk tent is preferable to the canvas dog tent of the army type as the former is absolutely waterproof and can be rolled into a very small bundle—18 inches long and about 8 inches in diameter—while the latter will leak if the down-pour of rain is especially heavy and of any duration, and when packed takes up more space in the car. The balloon silk tents also are proof against bugs and snakes as the top, walls and floor are made in one piece. They weigh 10 pounds each and cost from \$30 to \$40 if purchased from a big manufacturer with heavy overhead and advertising expenses, but can be

bought for about half that amount if ordered from a small maker.

The folding cots, which cost \$1.75 each, are not necessary and may be objected to by some because they are heavy and cumbersome but the motorist using them probably will sleep more comfortably than upon the ground. When not in use, they can be converted in a very compact piece of luggage, as they are not over 2 feet long when folded up.

The canvas bed rolls, which are waterproof and cost \$10 each, serve two purposes. They are made with pockets of varying sizes in the sides, some large enough for the packing of clothing and others only big enough for holding such small articles as a razor, tooth brush and comb. When the bed rolls are placed on the cot or spread on the ground at night, shoes, hose and underwear are placed in the various compartments and protected from the dew. During the day, they are rolled up, with clothing and toilet articles in the pockets and cots and blankets inside, and strapped on the running board of the car.

If folding cots are not used, spread straw or pine and cedar boughs on the ground before pitching the tent and staking it down. Nature thus has provided material for a mattress that is far superior to one of feathers or felt. While lying on it you get the "refreshing, restful Ostemoor sleep," without the Ostemoor expense.

The transcontinental tourist who plans to establish a permanent camp after patronizing the restaurants and tipping the hotel waiters en route, is advised not to purchase a cooking outfit before starting out and go to the inconvenience of carrying such impedimenta for several days when it will not be used. The better plan is to buy such an outfit at the last stopping place before going into camp. Purchase inexpensive cooking utensils and dishes and leave them behind when you break camp. If you want a refrigerator, get a small box and some charcoal or asbestos. Dig a hole in the ground for the box and pack the charcoal or asbestos around it. Provisions stored in such a receptacle will keep cool and will not spoil.

Two Stops for Meals Daily

The motoring camper will find it convenient to limit himself to two stops for meals daily. The sun will wake you between 5 and 5:30 o'clock. Break camp by 6. Drive for 2 hours and you will have an appetite for breakfast that would do credit to a lumberjack or white hope. Don't eat another heavy meal until about 5 o'clock, but carry some fresh fruit and crackers in the car to satisfy your hunger in the middle of the day. After supper spend an hour or two in the early evening on the road in search of a camp site. You will have little trouble finding one since the western people are noted for their hospitality and will be glad to grant

you permission to pitch your tents on their premises if you make such a request.

Motorists who plan to cook their own meals will have to supplement the equipment carried by the tourists intending to patronize the hotels and restaurants. First of all they must have a stove. The gasoline stove and the fireless cooker are not recommended as one is too heavy for transport and the other is not practical. A far better stove for the motorist is a piece of sheet metal, about 2 feet long and 1 foot wide, with folding or collapsible legs. Two large lard pans, one small enough to fit inside the other and leaving space enough to pack charcoal or asbestos in between, will serve as an icebox and can be carried on the running board of the car. Cooking kits, which fold up, and with the utensils and dishes nested, can be purchased at any sporting goods house or department store in the large cities. Such a kit is very light, since the kettles, pots, pans, plates and cups are made of aluminum, and takes up very little room.

Cooking Outfit Costs \$16

An aluminum cooking outfit especially suited for a party of four transcontinental motorists is manufactured by Abercrombie and sells for \$16. When packed it measures 10½ by 8½ inches and weighs 8¾ pounds. It consists of the following thirty-four pieces: one 2-quart coffee pot, two frying pans with detachable handles, three cooking pots with covers, and four soup bowls, cups, plates, knives, forks, desert spoons and teaspoons. These outfits also are made for parties of two, three, six and eight persons. The pots, pans and other utensils all nest in the largest pot and are packed in a canvas bag.

Similar cooking and eating outfits are made of retinned steel and although they

weigh a little over 2 pounds more, are less expensive, the outfit for a party of four selling for \$5.75. The number of pieces are identical with the aluminum sets.

Lists for the Motoring Camper

The camp equipment for a party of four should consist of the following articles: four 2-gallon African water bags; one 10-inch frying pan; collapsible stove or cooking grate; one 2-quart coffee pot; four large cups; four deep pans, about 5 inches in diameter; four knives; six forks, six teaspoons; two cooking spoons; four soup plates; eight plates, about 10 inches in diameter; one dipper; two stew pans; one three-prong cooking fork; one carving knife; three bars of soap; six dish towels; one bread pan for dish washing; one can opener; one bucket with lid, small cans for pepper and salt; one patent egg carrier; one cork screw; one air-tight coffee can, 2-pound; one air-tight tea can, ½-pound.

The following provisions should be carried in the grub box: one slab of bacon; three cans of peaches, three cans of pineapple, three cans of tomatoes, three cans of baked beans, three cans of corn, three cans of soup, one dozen eggs, four loaves of bread, one can of salt, one can of pepper, 1 pound of butter, 2 pounds of rice, 10 pounds of potatoes, six cans of evaporated milk, 1 pound of sugar, twelve boxes of safety matches, 2 pounds of prepared breakfast food, four boxes of graham crackers, four boxes of Uneda biscuits, 2 pounds of coffee (ground), and ½ pound of tea.

Frank H. Trego, chief engineer of the Lincoln highway, gives the following hints for motoring campers who are not experienced in woodcraft:



THE MOTORIST PREPARED FOR A NIGHT IN THE DESERT



CAMPING ON LAKE TAHOE AMONG THE MOST RESTFUL AND INSPIRING OF SCENIC SURROUNDINGS

"Fill the water bags with fresh water whenever you get a chance.

"Even when touring in mid-summer, don't fail to carry wool underwear and warm clothing with you. The high altitudes are cold and the dry air penetrating. Don't wear wool next to the skin, but put linen or cotton garments underneath it.

Making the Camp Fire Burn

"Always put out your camp fire before breaking camp. Don't build a big fire for cooking—the smaller the better. In building a fire, shave three small sticks and leave the shavings attached. Stand these in a pyramid with shavings pointed down and pile other small sticks against these in pyramid form before lighting, as a fire burns best when it has something to climb upon. If windy, build the fire in a trench and always on the lee side of the car to avoid possible sparks.

"If sleeping on the ground in a sleeping bag, wear heavy socks or moccasins. Sleep with the feet a little higher than the head. Avoid laying the bed in a hollow. Dig a trench for the hips in the bed location to prevent 'sore hip.' Make it about 2 inches deep with rounded edges and the width of the sleeping bag.

"Always camp on high ground and never near water on account of the mosquitoes. Clean up the camping ground before leaving it."

The motorist who has roughed it all the way across the continent need not relinquish the joys of camping life on reaching California for a tent city has been established at Atascadero, midway between San Francisco and Los Angeles on the Pacific boulevard, where tents for three of four persons can be rented for \$7.50 weekly with meals served at the following prices: breakfast and luncheon, 25 cents, and dinner, 50 cents.

If You Desire to Ship Your Motor Car

Information as to Freight Rates

MANY car owners in the extreme east, south and middle west will wish to ship their cars to more westerly points and tour from the latter through the country newer to them and thus save time in the sections with which they are acquainted and allowing of more leisurely driving in the regions which they never have frequented.

In all large cities there are shippers who make it a business to box or crate motor cars and quote the rates for sending the car to various points in the west. It always is best to allow one of these concerns to do the packing, for they employ material and methods which have proved successful in the past. To do it yourself may mean a waste of time and money. The classified telephone directory will show a number of such concerns listed. Besides being a safer method of shipping the car, it is cheaper in the long run to have it crated. The freight rate is reduced because of the lessened risk.

Chicago motorists desiring to ship their cars to the coast and then driving back have the following rates to consider, these being practically the same for all transcontinental railroads: If the car is to be shipped in carload lots, the rate is \$3 per 100 pounds with a minimum of 12,000 pounds taken. This means that the car to be shipped is to be placed in a freight car with other vehicles. For a 3,000-pound car the cost for shipping from Chicago to any coast terminal is \$90, provided the vehicle is sent in a freight car with others. If the owner wishes to ship less-than-carload, or in

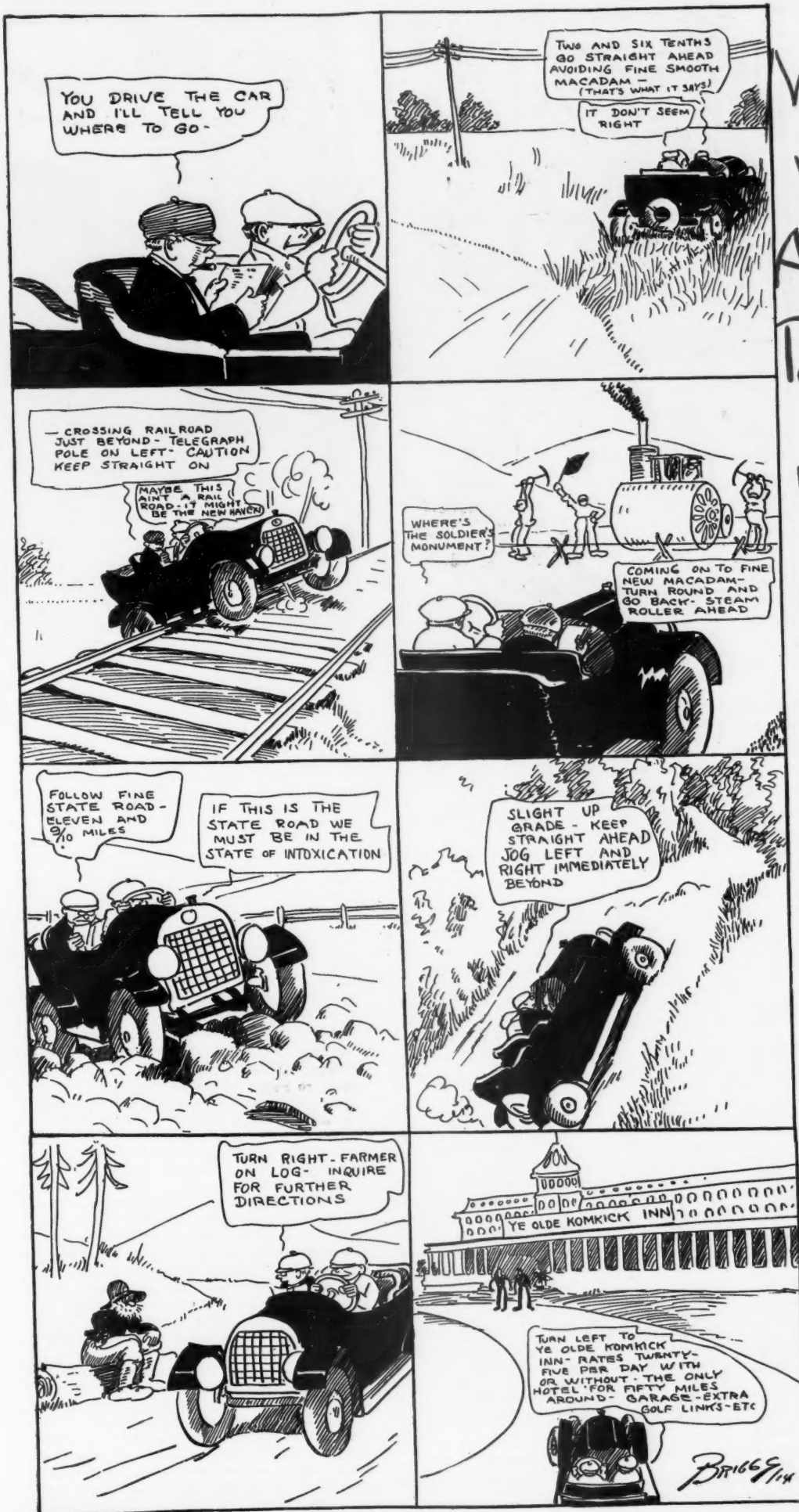
other words not necessarily with other vehicles, the rate is more than doubled, it being \$6.80 per 100 pounds or \$204 for a 3,000-pound touring car.

To ship a car uncrated or not boxed, is to lose money because the risk being greater, the railroad company makes an added charge. The difference between crated and uncrated cars is \$1.70 per 100 pounds actual weight, when shipped in less-than-carload lots from Chicago to the coast. In other words a 3,000-pound car uncrated would cost \$204 and \$153 when crated.

There are many Chicagoans who wish to ship to Denver and travel from the latter city to the coast by motor. For them the rate is \$1.80 per 100 pounds in carload lots and \$3.60 in less-than-carload lots. This means a 3,000-pound car shipped with others in the same freight car would cost \$54, while shipped otherwise the cost is \$108. The latter rate is reduced when the vehicle is crated or boxed.

Many New York and Buffalo motorists will ship their cars to Chicago or Denver perhaps and motor the remainder of the distance. From New York to Chicago the rate is 68.3 cents per 100 pounds when shipped in carload lots and 118.2 cents when shipped in less-than-carload lots. The rates quoted are for the Pennsylvania road and differ little for the others.

From Buffalo to Chicago the rate is only 41 cents per 100 pounds for carload lots and 71 cents for less-than-carload or \$12.30 for a 3,000-pound car the former way and \$21.30 the latter way.



MOTORING WITH THE AID OF A BLUE BOOK

BY COURTESY OF THE NEW YORK TRIBUNE



"Contrary to the cartoon, I really couldn't have gotten along without the Blue Book, and I found it wonderfully accurate. Still, the idea of a guide book such as I referred to in the cartoon struck me as being worth drawing even if it wasn't the truth. These days no matter how much truth exists, a satire on the truth seems to tickle the public."—BRIGGS.

With Rod and Gun to the Coast

AS the main highways to the Pacific coast are both motor roads and game trails, many of the transcontinental tourists who will drive to the expositions this spring and summer will hunt and fish en route, depending upon their skill with rod and gun to provide meat for the camp. They will whip the mountain streams for trout and bass, and in the forests of the west track the lumbering bear and wily deer. In hunting and fishing, these sportsmen will find relief from the monotony of continual driving.

The trip to California gives the motorist-sportsman, who aims to emulate the feats of Isaak Walton with rod and those of Theodore Roosevelt with gun, a splendid opportunity to bag his favorite game. Should he travel the Lincoln highway, he will cross Wyoming, a state noted throughout the world for its bear hunting. In New Mexico and Arizona, both traversed by the National Old Trails highway, he will find mountains where bear, lion, deer, turkey and grouse abound. Among the majestic Rockies of Colorado he may angle for trout in streams that are literally choked with fish.

Hunters and Fishers Welcome

In none of the states west of the Mississippi is the non-resident fisher and hunter barred. He may bait his hook and sight along the barrel of his fowling piece without molestation, providing he takes out a license and observes the laws regarding the closed seasons for fish and game in the several states. The hospitable inhabitants of the plains and mountains will welcome him as a fellow sportsman and volunteer to direct him to the best trails and streams.

Before starting forth with rod and gun, the eastern sportsman should study the game laws of the state or states in which he intends to fish or hunt. If he fails to do so he may run afoul of a game warden and be ordered to pay a heavy fine by a magistrate. Bear hunting in Wyoming, without a guide, for example, is a felony; mountain sheep, antelope, quail and prairie chickens are protected by the statutes of New Mexico. For the benefit of tourists who plan to fish and hunt while driving to

California, a digest of the game laws of the several western states is printed herewith.

NEBRASKA

License Fees—Non-residents to hunt and fish, \$10. Non-residents to fish with hook and line only, \$2.

Bag Limit—Twenty-five birds or ten squirrels and twenty-five game fish in 1 day. Ten geese, prairie chicken, quail and fifty other game birds or fifty game fish in possession at any one time.

Open Seasons—Ducks, geese and waterfowl, September 1 to April 5; prairie chickens, grouse and sage hens, September 1 to December 1; jack snipe, wilson snipe, kill deer and yellowlegs, September 1 to May 1; plovers and doves, July 15 to September 1; squirrels, October 1 to December 1; bass not less than 8 inches in length, April 1 to November 15; trout not less than 8 inches in length, April 1 to October 1; all other fish, April 1 to November 15; quail, November 1 to November 15.

SOUTH DAKOTA

License Fees—Non-residents to fish, \$2. Non-residents to hunt game birds and animals, \$25. Non-residents to hunt game birds, \$15.

Bag Limit—One deer a year; twenty waterfowl, ten other birds a day; twenty-five partridges, ruffed grouse, prairie chicken, sharp-tailed grouse, pheasants, woodcocks, golden plover and upland plover in aggregate in possession at one time; fifty snipe and waterfowl in aggregate possession at one time.

Open Seasons—Deer, except fawns, November 1 to December 1; partridge, grouse, prairie chicken, golden plover, snipe and yellowlegs, September 10 to October 10; rail, coop and gallinule, September 7 to December 1; woodcock, October 1 to October 10; duck, goose and brant, September 10 to December 1.

ARIZONA

License Fees—Non-residents to hunt deer, \$25. Non-residents to hunt birds and fish, \$10.

Bag Limit—Two deer, three turkeys a season; twenty-five each of quail or ducks, thirty-five doves or white wings a day, twenty pounds of trout, bass, crappie or catfish, or forty individual fish in 1 day.

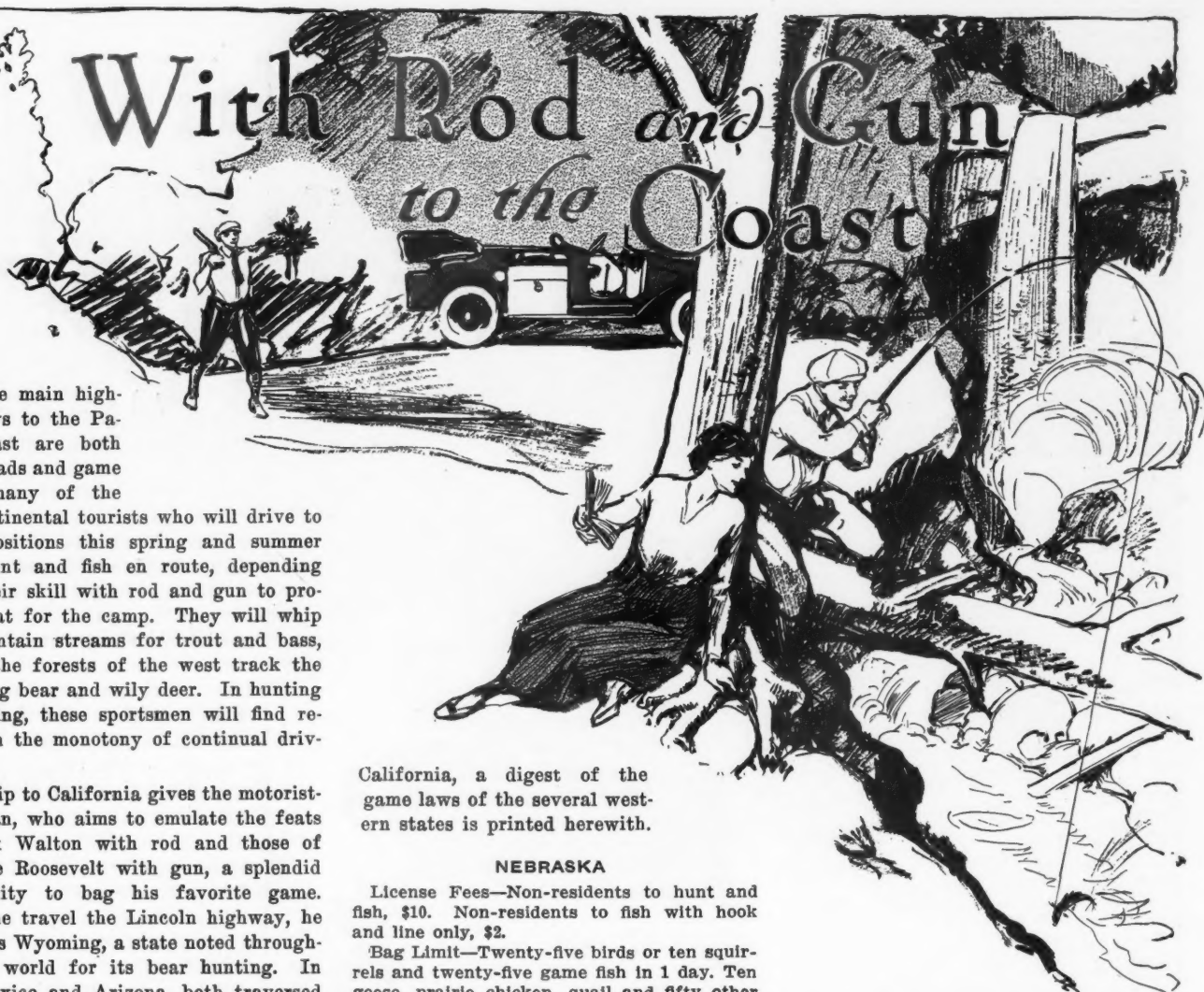
Open Seasons—Male deer, October 1 to December 16; quail, October 15 to February 2; wild turkey, October 1 to December 16; dove and white wing, June 1 to February 2; gallinule, September 1 to December 1; rail, October 15 to December 1; snipe, plover, yellowlegs, coop, duck, goose and brant, October 15 to February 1.

CALIFORNIA

License Fees—Non-residents to hunt, \$10. Non-residents to fish, \$3.

Bag Limit—Two deer, twelve tree squirrels a season; fifteen cottontail or bush rabbits; four grouse; four sage hens; ten mountain quail; twenty each of desert or valley quail, doves, plover, curlew, snipe or other shore birds and ibises, and twenty-five ducks and black sea brant a day; fifty ducks or black sea brant in a week; twenty black or spotted trout per day, twenty golden trout per day, not more than twenty-five black bass per day, and all other trout, fifty fish.

Open Seasons—Male deer in second, fourth and fifth districts, July 1 to September 1. In first and third districts, August 15 to November 1. In sixth district, August 15 to September 15. Rabbits, July 31 to February 1; Valley quail, October 15 to February 15, except in sixth district where the open season extends from October 15 to November 15; mountain quail, grouse and sage hen, September 1 to December 1; doves, July 15 to October 1; in second and fifth districts, August 1 to October 15; in fourth and sixth dis-



tricts, September 1 to November 1; black-breasted and golden plover, jacksnipe and yellowlegs, November 15 to February 1; rail, fantail pigeon and wood duck protected until September 1, 1918. Coot, Gallinule, duck and goose, October 15 to February 1; black brant, November 1 to February 1; white fish and trout, May 1 to November 30 in first and fourth districts; April 16 to October 31 in second district; May 1 to October 31 in third and seventh districts, and April 1 to October 31 in fifth and sixth districts. Golden trout from June 1 to August 31; black bass, June 1 to December 31 in first, fifth, sixth and seventh districts; July 1 to March 31 in the second district; May 1 to December 31 in the third district and May 1 to November 30 in fourth district.

COLORADO

License Fees—Non-residents to hunt game and birds, \$10. Non-residents to fish, \$2. Non-residents combined hunting and fishing license, \$12.

Bag Limit—No person shall kill more than 20 birds in the aggregate of all kinds in any one calendar day, nor have in possession more than 30 birds in the aggregate of all kinds at any one time, and 20 pounds of fish in any one calendar day and 25 pounds in possession.

Open Seasons—Trout and grayling in running streams, May 25 to October 31; in lakes of an altitude not to exceed 7,500 feet, May 1 to October 31; in lakes of an altitude of over 7,500 feet, June 1 to October 31; white fish from October 1 to May 1; ducks, geese, brants, swans, cranes and plovers, September 1 to April 20; prairie chickens and mountain and willow grouse, August 15 to October 10; sage chickens, August 1 to September 1; curlews and yellowlegged snipes, August 1 to April 20; doves, August 15 to August 31. No open season on elk, deer, mountain sheep, antelope, wild turkey, quail, or pheasants, or on bass, catfish, or wall-eyed pike.

IDAHO

License Fees—Non-residents to hunt big game, \$25. Non-residents to hunt birds only, \$5. Non-residents to fish, \$1.

Bag Limit—Two deer, one elk, one ibex, one goat and one sheep a season; eighteen quail, twelve each of partridges, sage hens, grouse, pheasants; twenty-four doves, plover, snipe, ducks, four geese, and one swan a day; but not more than twenty-four of all kinds in possession at one time.

Open Seasons—Deer, elk, sheep, goat, September 1 to December 1. Exceptions: In Bonner, Clearwater, Idaho, Kootenai, Latah, Nez Perce, and Shoshone counties, deer, September 20 to December 20; elk, September 1, 1916; in Fremont, Bonneville, and Bingham counties, elk, September 1 to January 1; in Bear Lake, Cassia, Oneida, and Twinfalls counties, deer, elk, sheep, and goat, September 1, 1916. Quail, November 1 to December 1; partridge, pheasant, grouse (except north of Salmon river, September 1 to December 1), August 15 to December 1; turtle dove (except in Fremont county, August 15 to December 1), sage hen, July 15 to December 1.

MONTANA

License Fees—Non-residents to hunt and fish, \$25. Non-residents to hunt birds only and fish, \$10.

Bag Limit—Three deer (one doe and two bucks, or three bucks), one elk, one goat, one male sheep a season; five each of grouse, partridges, prairie chickens, fool hens, pheasants, sage hens and twenty ducks a day.

Open Seasons—Deer, sheep (male), goat, October 1 to December 1; elk, October 1, 1918. Exceptions: In counties of Sweetgrass, Park, Gallatin, Madison, Teton, Flathead, and those portions of Powell and Missoula coun-

ties drained by South Fork of Flathead and Swan rivers, respectively, Beaverhead county east of Oregon Short Line R. R. between Willis and Armstead, and Beaverhead county south of Pittsburg & Gilmore R. R., October 1 to December 1; moose, caribou, fawns, female sheep and lambs, antelope, bison or buffalo, no open season; quail, Chinese pheasant, Hungarian pheasant, dove, no open season; pheasant, partridge, prairie chicken, sage hen, fool hen, grouse, October 1 to November 1; black-breasted and golden plover, jacksnipe or Wilson snipe, and yellowlegs, duck, goose, brant, September 1 to December 16; rail, coot and gallinule, September 1 to December 1.

KANSAS

License Fees—Non-residents to hunt and fish, \$15.

Bag Limit—Twelve each of dove, plover, duck and twelve snipe and six each of geese and brant a day.

Open Seasons—Deer, antelope, quail, prairie chickens, pheasants, and partridge protected; plover, snipe and yellowlegs, September 1 to December 16; woodcock, November 1 to January 1; rail, coot and gallinule, September 1 to December 1; duck, goose, brant, September 15 to February 1.

NEVADA

License Fees—Non-residents to hunt, \$10. Special fishing license good for but 30 days, \$2.

Bag Limit—Two deer a season; fifteen mountain quail, fifteen valley quail, ten sage hens, six grouse, five plover, fifteen snipe, twenty ducks, ten geese and three swans a day. Ten pounds of game fish is the limit of catch for one day but ten trout, salmon or black bass may be taken.

Open Seasons—Deer (males only), October 15 to November 16; antelope, female deer, spotted fawn, no open season; mountain sheep and goat, January 1, 1920; mountain quail, October 1 to January 2; valley quail, October 15 to January 16; grouse, October 1 to December 16; bobwhite, partridge, pheasant, other imported birds, no open season; sage hen, July 15 to October 2; woodcock, November 1 to January 1; plover, snipe, yellowlegs, September 15 to December 16; rail, coot, gallinule, September 1 to December 1; duck, goose, brant, October 1 to January 16.

NEW MEXICO

License Fees—Non-residents to hunt and fish, \$10.

Bag Limit—One deer per season, four wild turkeys, six grouse, twenty ducks, and

thirty other birds a day or in possession at one time; fish limit is twenty-five pounds of trout or bass per day or in possession at any one time.

Open Seasons—Elk, mountain sheep, mountain goats, antelope, quail and prairie chickens are protected. Deer with horns, September 1 to November 15; grouse, September 1 to November 15; wild turkeys, November 1 to January 15; doves, July 1 to September 30; snipe, curlew, plover and ducks, September 1 to March 31; trout, catfish, crappies or ring perch, May 15 to October 15.

NORTH DAKOTA

License Fees—Non-residents to hunt and fish, \$25.

Bag Limit—Ten prairie chickens, grouse, cranes, combined a day, twenty in possession at one time; twenty-five plover, snipe, woodcock, ducks, geese, brant combined, fifty in possession at one time. Bag limit of game fish limited to daily catch of fifteen and possession of fifty.

Open Seasons—Deer, antelope, partridges, pheasants, quail, duck and swan are protected; prairie chickens, grouse, snipe and plover, September 7 to November 1; wild ducks, geese, brant and crane, September 7 to December 15; trout and land-locked salmon, May 1 to October 1; bass, June 1 to October 15; pike, crappies or perch, May 1 to October 15.

UTAH

License Fees—Non-residents to hunt and fish, \$5, not required for rabbits.

Bag Limits—Twenty-five grouse a season, fifteen quail, eight sage hens, six grouse a day or in possession at one time; twelve geese a day and twenty-five in all of snipe, ducks and geese a day. Daily catch of fish is limited to fifteen pounds and fifty pounds in possession.

Open Seasons—Non-residents are not permitted to kill deer; and elk, antelope and sheep are protected. Open season for quail in Garfield, Kane and Washington counties is September 1 to February 1; in Carbon, Davis, Salt Lake, San Pete, Sevier, Uintah, Utah and Weber counties, October 1 to November 1; in Iron county, October 1 to December 1; grouse, October 6 to 16; sage hens, August 15 to November 1; snipe, October 1 to December 16; duck and geese, October 1 to January 1; rail, coot and gallinule, October 1 to December 1. Open season for fishing is from February 15 to March 31 and from June 15 to November 30.

WYOMING

License Fees—Non-residents to hunt and fish, \$50. Non-residents to hunt bear, \$10. Non-residents to hunt only birds and fish, \$5.

Bag Limit—One deer, two elk, one male sheep a season; eighteen birds, of which not more than six may be grouse, a day or in possession at any one time.

Open Seasons—Deer (does and fawns, no open season), October 1 to November 1. Exception: Fremont, Lincoln, and Park counties, September 1 to November 16. Elk and male sheep in Lincoln, Park, and Fremont counties north of Big Wind river and Bad Water creek and also in Fremont county south of Sweetwater river, September 1 to November 16; elk and sheep in rest of state, moose, antelope, 5 years, September 1, 1918; quail (except in Crook county, September 25, 1917), Mongolian pheasant, September 25, 1915; grouse (other than sage grouse), September 15 to November 16. Exception: All grouse in Albany, Carbon, Laramie, and Sweetwater counties, July 15 to September 1. Sage grouse (except in Sheridan county, August 1, 1915), August 1 to September 1; dove, swan, no open season; black-breasted and golden plover, jacksnipe or Wilson snipe, yellowlegs, September 1 to December 16; curlew, September 1, 1913; rail, coot, gallinule, September 1 to December 1; duck, goose, brant, September 1 to December 16.

Much Touring on Coast

LOS ANGELES, Cal., Feb. 15.—Every L state in the union is represented in Southern California at this time by motoring parties. Illinois leads in the number of machines sent to Southern California for the winter touring season. Forty-three touring parties from Illinois have registered at the Automobile Club of Southern California since the middle of January and there are several cars on the boulevards bearing Illinois plates which have not appeared at the club.

Second in line is Washington with twenty-seven machines. Minnesota is represented by nineteen cars; Michigan, fifteen; Pennsylvania, nine; Montana, eight; New York, eight; Missouri, eight; Kansas, Ohio and Oregon, seven each; Colorado, Iowa and Arizona, six each; Connecticut, Wisconsin and Utah, five each; British Columbia is also represented by five.

Hotel and Garage on the



CENTRAL NEW YORK-LINCOLN HIGHWAY ROUTE

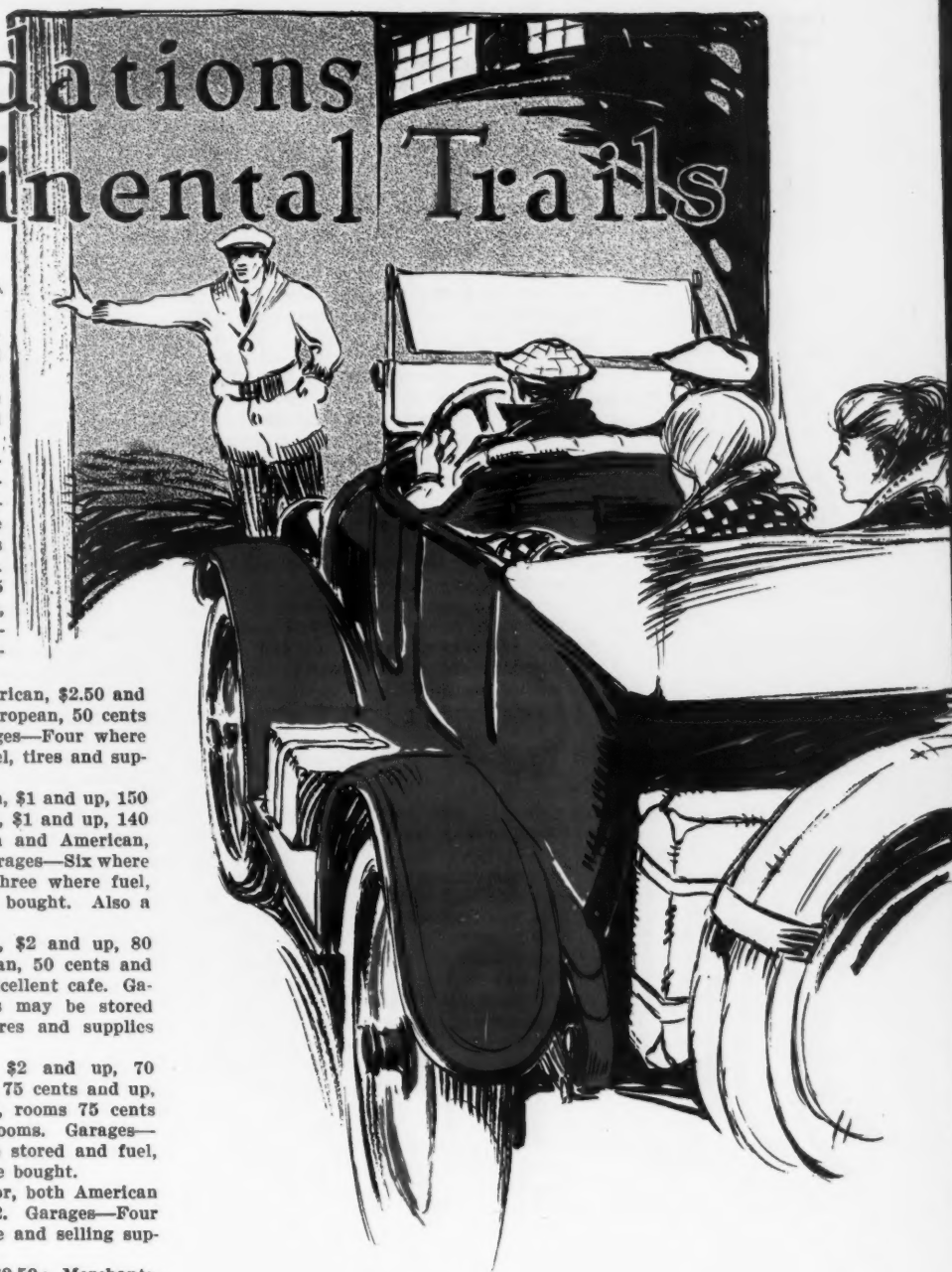
- | Inter.
Dist. | Town or City | |
|-----------------|---------------------|---|
| 0.0 | New York City. | |
| 72.5 | Poughkeepsie, N. Y. | Hotels—Morgan, European and American; Nelson, European and American; Sussack, European. Garages—Seven where cars can be stored and supplies bought. |
| 74.1 | Albany, N. Y. | Hotels—Ten Eyck, European, \$2 and up, 350 rooms; Kenmire, European, \$1.50 and up, 175 rooms; Hampton, European, \$2 and up, 200 rooms. Garages—Several where cars can be stored and carrying supplies. |
| 15.0 | Schenectady, N. Y. | Hotels—Edison, American, \$3 to \$4 per day, 80 rooms; Mohawk, European, \$1 up, 80 rooms; New Vendome, American, \$2.50 per day, 70 rooms. Garages—Two where cars can be stored; four where fuel, tires and supplies can be bought. |
| 15.8 | Amsterdam, N. Y. | Hotel—Warner, European and American, \$2.50 a day, 75 rooms. Garages—Four where cars can be stored and three where fuel, tires and supplies can be bought. |
| 50.9 | Geneva, N. Y. | Hotels—Nester, European and American, \$3 per day, 100 rooms; Kirkwood, American, \$2, 75 rooms; Carrollton, European and American, 75 rooms. Garages—Two where cars can be stored and three where fuel, tires and supplies can be bought. |
| 46.0 | Rochester, N. Y. | Hotels—Seneca, European, 350 rooms; Powers, European, 450 rooms; Rochester, 300 rooms; Eggleston, European, 125 rooms; and Whitcomb, European, 200 rooms. Garages—Six where cars can be stored and also where fuel, tires and supplies can be bought. Also three supply houses. |
| 37.3 | Batavia, N. Y. | Hotel—Richmond, American, \$2.50 to \$3.50 per day, 85 rooms. Garages—Three where cars can be stored and where fuel, tires and supplies can be bought. |
| 38.6 | Buffalo, N. Y. | |
| 49.3 | Fredonia, N. Y. | Hotel—Columbia, American, \$2 and \$3. Garages—Three affording storage and selling supplies. |
| 55.5 | Erie, Pa. | Hotels—Reed, European, \$1 and up, 200 rooms; Lawrence, European, \$1.50 and up, 175 rooms. Garages—Ten where cars can be stored and fifteen where fuel, tires and supplies can be bought. Also a supply house. |
| 48.8 | Ashtabula, Ohio. | Hotels—Warren, European, \$1 and up, 35 rooms; James, American, about \$4, 35 rooms. |
| 57.2 | Cleveland, Ohio | |
| 33.4 | Oberlin, Ohio. | Hotel—Park, American, \$2 and up, 43 rooms. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought. |
| 23.7 | Norwalk, Ohio. | Hotels—Analon, European, \$2.50 and up, 80 rooms; Colonial, American, \$2 and up, 50 rooms. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought. Also large supply house where cars can be stored and where fuel, tires and supplies can be bought. |
| 13.2 | Bellevue, Ohio. | Hotels—Mayne, American, \$2, 30 rooms; Bourdette, 35 rooms. Garages—Four where cars can be stored and three where fuel, tires and supplies can be bought. |
| 14.9 | Fremont, Ohio. | Hotels—Fremont, American, \$2.25 and up per day, 60 rooms; Jackson, European, \$1 and up, 40 rooms. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought. |
| 34.1 | Toledo, Ohio. | |
| 63.3 | Bryan, Ohio. | Hotel—Christman, American, \$2 and up, 75 rooms. Garages—Two where cars can be stored and three where fuel, tires and supplies can be bought. |
| 40.5 | Kendallville, Ind. | Hotels—Kelly, European, \$2 and up, 50 rooms; Reyher, American, \$2 and up. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought. Also a supply house. |
| 56.5 | Goshen, Ind. | Hotel—Alderman, American, \$2.50 and up, 70 rooms. Garages—Five where cars can be stored and fuel, tires and supplies can be bought. |
| 23.9 | South Bend, Ind. | Hotel—Oliver, European, \$1 and up, 240 rooms. Garages—Seven where cars can be stored and fuel, tires and supplies bought. |
| 26.7 | Laporte, Ind. | Hotels—Rumely, European, \$1.50 and up, 90 rooms; Richter, European, 75 cents and up per day. Garages—Four where cars can be stored and carrying supplies. |
| 22.7 | Valparaiso, Ind. | Hotels—Albe, American, \$2, 12 rooms; Spindler, American, \$2, 25 rooms. Garages—Four where cars can be stored and fuel, tires and supplies can be bought. |
| 51.6 | Chicago. | |
| 40.0 | Aurora, Ill. | Hotels—Bishop, European and American, \$2; Arthur, European and American, \$2; Grand, European and American, \$1.50; Arlington, European and American, \$1.50; Schlitz, European and American, \$1.50. Garages—Eight where cars can be stored and where fuel, tires and supplies can be bought. |

Accommodations Transcontinental Trails

Inter.

Dist. Town or City

- 38.2 Rochelle, Ill. Hotel—Collier Inn, European and American, \$2 and up, 50 rooms. Garages—Four where cars can be stored and fuel, tires and supplies can be bought.
- 26.0 Dixon, Ill. Hotels—Dixon Inn, European, \$2, 150 rooms; Nachusa Tavern. Garages—Three where cars can be stored and where fuel, tires and supplies can be bought.
- 13.4 Sterling, Ill. Hotels—Galt, European, 75 cents to \$1.50; Randolph, American, \$2. Garages—Five for storage and dealing in supplies.
- 29.9 Clinton, Ia. Hotels—Lafayette Inn, American, \$2.50 and up, 108 rooms; Kehoe, European, 50 cents and up, 90 rooms. Garages—Four where cars can be stored and fuel, tires and supplies can be bought.
- 88.1 Cedar Rapids, Ia. Hotels—Montrose, European, \$1 and up, 150 rooms; Magnus, European, \$1 and up, 140 rooms; Allison, European and American, \$1 and up, 150 rooms. Garages—Six where cars can be stored and three where fuel, tires and supplies can be bought. Also a supply house.
- 76.4 Marshalltown, Ia. Hotels—Pilgrim, American, \$2 and up, 80 rooms; Stoddart, European, 50 cents and up, 46 rooms; also an excellent cafe. Garages—Seven where cars may be stored and four where fuel, tires and supplies may be bought.
- 55.2 Boone, Ia. Hotels—Holst, American, \$2 and up, 70 rooms; Craig, European, 75 cents and up, 75 rooms; Northwestern, rooms 75 cents and meals 50 cents, 27 rooms. Garages—Four where cars may be stored and fuel, tires and supplies may be bought.
- 59.0 Carroll, Ia. Hotels—Burke and Windsor, both American plan with daily rate of \$2. Garages—Four offering room for storage and selling supplies.
- 28.0 Denison, Ia. Hotels—Denison, \$2 to \$2.50; Merchants, \$1.50; both American plan. Garages—Two.
- 77.8 Omaha, Neb. Hotel—The Fontenelle. Just opened; recommended as modern and reasonable in price.
- 82.6 Columbus, Neb. Hotels—Evans, American and European, \$2 and up, 75 rooms; Thurston, European and American, \$1 and up, 65 rooms; Meridian, European and American, \$1 and up, 50 rooms; Clothier, European and American, \$1 and up, 50 rooms. Garages—Five where cars can be stored and where fuel, tires and supplies may be bought.
- 64.1 Grand Island, Neb. Hotels—Koehler, European, \$2 and up, 100 rooms; Palmer House, American plan, \$2 and up, 125 rooms. Garages—Five where cars can be stored and where fuel, tires and supplies may be bought.
- 45.3 Kearney, Neb. Hotels—Midway, American, \$2 and up, 100 rooms; Jacks Cafe, European, \$2, 20 rooms; Union Pacific, American, \$1.50 and up, 30 rooms. Garages—Three where fuel, tires and supplies may be bought.
- 39.5 Lexington, Neb. Hotel—Cornland, American, \$2 and up, 50 rooms. Garages—Three where cars may be stored and two where fuel, tires and supplies may be bought.
- 79.2 North Platte, Neb. Hotels—Timmerman, European, \$1 and up, 53 rooms; Ritner, European, \$1 per day, 27 rooms; Union Pacific, European and



Inter.

Dist. Town or City

- American, \$1 and up, 40 rooms. Garages—Three where cars can be stored and four where fuel, tires and supplies may be bought.
- 84.6 Julesburg, Colo. Hotels—Brown, European, 50 cents per day, 53 rooms; Commercial, American, \$2 per day, 12 rooms; Pioneer, European, 50 cents per day, 10 rooms; Julesburg, European, 50 cents per day, 14 rooms. Garages—One where cars can be stored and where fuel, tires and supplies may be bought.
- 42.4 Sidney, Neb. Hotel—National, European, \$2 per day. Garage—One where cars can be stored and where fuel, tires and supplies may be bought. There is also a machine shop where parts are made.
- 101.0 Cheyenne, Wyo. Hotels—Plaines, European, \$1 and up; Interocean, European, \$1 and up, 50 rooms; Moffat, 75 cents and up, rooms only; Normandie, 75 cents and up, rooms only; Metropolitan, 75 cents and up, 40 rooms. Garages—Four where cars can be stored and where fuel, tires and supplies may be bought.
- 55.6 Laramie, Wyo. Hotels—Kuster, European, \$1 and up, 40 rooms; Connor, European, \$1 and up, 65

Inter.
Dist. Town or City

- rooms; Johnson, European, \$1 and up, 40 rooms. Also rooming houses about town. Garages—Three where cars can be stored and where fuel, tires and supplies may be bought. There is also a supply house in the town.
- 62.1 Medicine Bow, Wyo. Hotel—The Ferris, American, \$3, 80 rooms. Also rooming houses and restaurants at very reasonable prices. Garages—Two where cars can be stored and two where fuel, tires and supplies may be bought. There are also supply houses and a filling station.
- 63.9 Rawlins, Wyo. Hotels—Commercial, American, \$3 per day, 30 rooms; The Elk, European, 50 cents and up, 35 rooms; The Moose, European, \$1 and up, 30 rooms; Valley House, European, 50 cents and up, 46 rooms. Garages—One where cars may be stored and one or two where fuel, tires and supplies may be bought.
- 113.4 Rock Springs, Wyo. Hotel—Marx.
- 114.2 Evanston, Wyo. Hotel—Marx.
- 82.4 Salt Lake City, Utah.
- 296.8 Ely, Nev. Hotels—Northern, European, \$1 and up, 64 rooms; Hayes, European, \$1 and up, 30 rooms; Lawler, European, 50 cents and up, 20 rooms; Renshaw, European and American, 50 cents, 26 rooms; and Alamo, European, 50 cents, 32 rooms. Garages—

Inter.
Dist. Town or City

- One where cars can be stored and fuel, tires and supplies may be bought. Also a supply house.
- 147.3 Austin, Nev. Hotel—International, European, \$1 and up, 30 rooms. Garage—One where cars can be stored; two where fuel, tires and supplies may be bought.
- 149.4 Wadsworth, Nev. Hotels—Nevada, European, 50 cents and up, 20 rooms; Columbus, American, \$1.50 and up. Garages—Two where cars can be stored and where fuel, tires and supplies may be bought.
- 34.0 Reno, Nev. Hotels—Riverside, American, \$2.50 and up, 150 rooms; Golden, European, \$1 and up, 200 rooms; Overland, European, \$1 and up, 60 rooms; McKiddick, European, \$1 and up, 90 rooms. Garages—Five where cars can be stored and three where fuel, tires and supplies may be bought. Also a supply house. Drivers experienced in desert travel can be obtained in Reno.
- 35.3 Truckee, Cal. Hotels—Southern Pacific, American and European, \$1.50, 30 rooms; Whitney, European, \$1 per day, 50 rooms; White House, American and European, \$2.50, 10 rooms. Garages—Two where cars can be stored and one where fuel, tires and supplies may be obtained.
- 117.6 Sacramento, Cal.
- 127.6 San Francisco.

RED LINE—PIKE'S PEAK ROUTE, ACROSS KANSAS, COLORADO AND UTAH

Inter.
Dist. Town or City

- 0.0 Kansas City.
- 43.3 Lawrence, Kan. Hotels—Eldridge, American, \$2 and up, 125 rooms; Savoy, American, \$2 per day, 50 rooms; Hiawatha, European, \$1 and up, 25 rooms. Garages—Four where cars can be stored and where fuel, tires and supplies may be bought. There is also a small supply house.
- 32.3 Topeka, Kan. Hotels—National, American, \$2.50 and up, 125 rooms; Throop, American, \$2.50 and up, 100 rooms; Glenwood, European, 50 cents and up, 50 rooms; Rex, American and European, 75 cents and up, 50 rooms. Garages—Six where cars may be stored and five where fuel, tires and supplies may be bought. Also a supply house in the town.
- 59.0 Manhattan, Kan. Hotels—Baltimore, European, 50 and 75 cents; Gillett. Garages—Six offering storage room and carrying supplies.
- 98.0 Beloit, Kan. Hotels—The Avenue, American, \$2 and up, 66 rooms; The Commercial, American \$1.50 per day, 40 rooms. Garages—Six where cars can be stored and three that carry fuel, tires and supplies. There is also a supply house in Beloit. The nearest places east and west where tourists can obtain hotel and garage accommodations are: east, Glasco, 20 miles, and west, Glen Elden, 12 miles.
- 60.0 Stockton, Kan. Hotels—Hicks, American plan, \$2 per day, 40 rooms; City Hotel, American plan, \$1.50 per day. Garages—Two where cars may be stored; one where fuel, tires and supplies may be bought. Also a well-equipped supply house.
- 91.0 Colby, Kan. Hotels—O'Peet, American, \$2; Commercial. Garage—One.
- 150.0 Limon, Colo. Hotels—Limon, American, \$2 per day, 20 rooms; Railroad Hotel, American, \$3 per day, 20 rooms; and Lincoln, American, \$2 per day, 25 rooms. Garages—Two

Inter.
Dist. Town or City

- where cars can be stored and where fuel, tires and supplies can be bought.
- 85.9 Colorado Springs, Colo. Hotels—Acacia, European, \$1 to \$5; Alamo, European, \$1 up; Alta Vista, European, \$1 up; Antlers, European, \$1.50 up. Garages—Seven where cars can be stored and ten where fuel, tires and supplies may be bought. Also a supply house in town.
- 93.7 Buena Vista, Colo. Hotels—Princeton, American, \$2.50 per day, 35 rooms; Bay's Hotel, American, \$2.50 per day, 20 rooms. Garages—Two where cars can be stored and where fuel, tires and supplies may be bought. The nearest towns where tourists can find garage and hotel accommodations are: East, Hartsell; south, Salda; west, Leadville.
- 41.8 Leadville, Colo. Hotels—Vendome, European, \$1 and up, 120 rooms; Delaware, European, 50 cents and up, 80 rooms. Garages—Two where cars can be stored and where fuel, tires and common supplies may be bought. The nearest towns where tourists can find garage and hotel accommodations are: East, Buena Vista, 42 miles; west, Redcliff, 25 miles.
- 90.7 Glenwood Sprgs., Colo. Hotels—Colorado and Glenwood, both American plan. Garages—Several offering accommodations.
- 28.0 Rifle, Colo. Hotel—Winchester, American, \$2.50 per day, 40 rooms. Garages—Three where cars can be stored and where fuel, tires and supplies may be bought.
- 43.0 Meeker, Colo. Hotels—Waldon House, European, 50 cents and up, 20 rooms; Meeker, European hotel, 50 cents and up, 40 rooms. Garages—Two where cars may be stored and where fuel, tires and supplies may be bought.
- 118.0 Vernal, Colo.
- 108.0 Provo, Utah. Hotel—Roberts, American, \$2.50.
- 45.0 Salt Lake City.

NATIONAL OLD TRAILS HIGHWAY THROUGH THE SOUTHWEST

Inter.
Dist. Town or City

- 0.0 Washington, D. C.
- 43.4 Frederick, Md. Hotel—New City, American, \$2.50 and up, 100 rooms. Garages—Two where cars can be stored and where fuel, tires and supplies may be bought; also a supply house in town.
- 25.9 Hagerstown, Md. Hotels—Baldwin, American, \$2 and \$3; Dag-

Inter.
Dist. Town or City

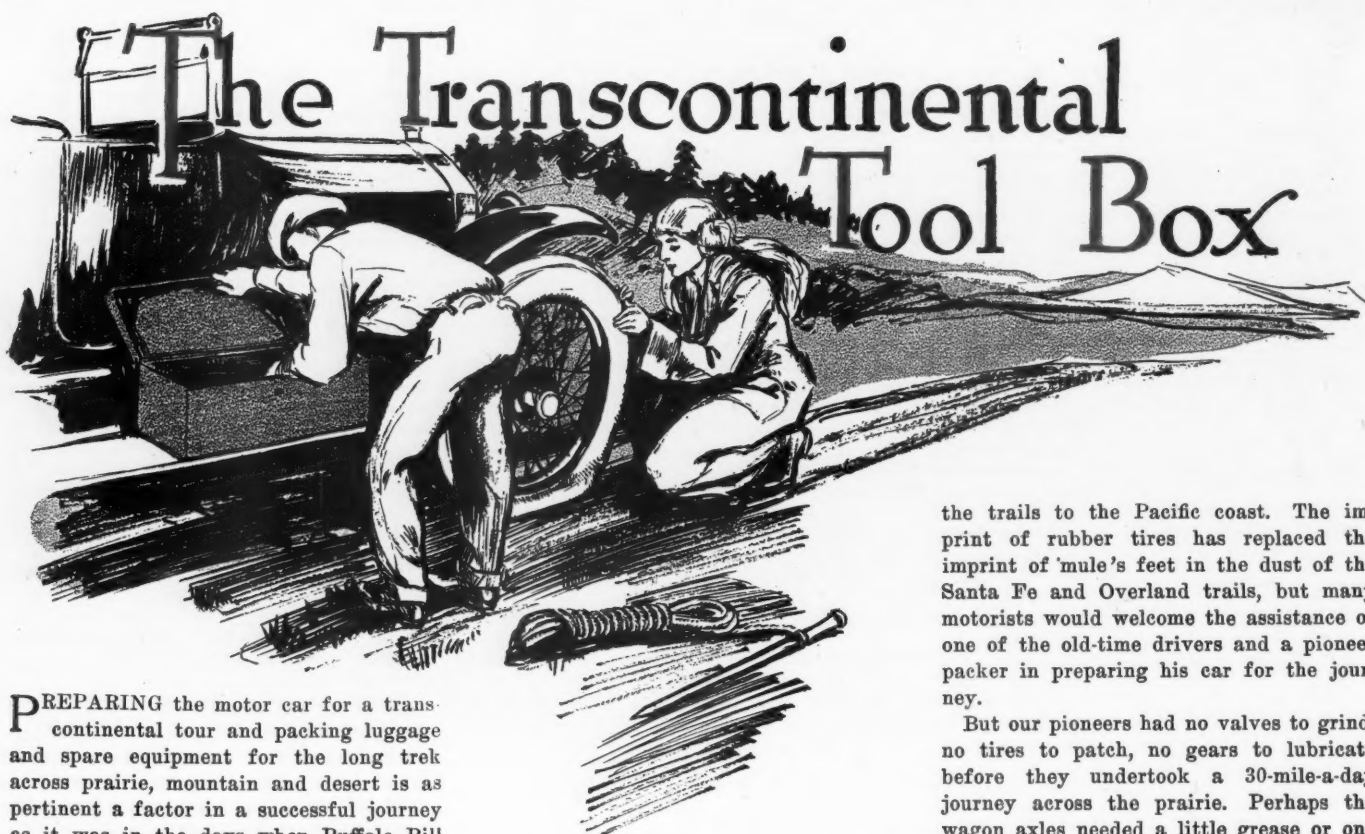
- mar, European, \$1 and \$1.50; Hamilton, American, \$2.50 and \$3.
- 65.7 Cumberland, Md. Hotels—Cavanaugh, European, \$1; Inn, European and American; Queen City, American, \$2 to \$3.50; Windsor, American, \$2 to \$3.
- 63.9 Uniontown, Pa. Hotels—Titlow, European, \$1 and up, 75

Inter.
Dist. Town or City

- rooms; Gallatin, European, \$1 and up, 40 rooms; Fuller, American, \$2 and up, 40 rooms; Duquesne, American, \$2 and up, 40 rooms; McClelland, American, \$2 and up, 40 rooms, and Brunswick, American, \$2 and up, 40 rooms. Garages—Four where cars can be stored and fuel, tires and supplies can be bought.
- 36.7 Washington, Pa. Hotel—Auld, American, \$2 and up, 50 rooms. Garages—Eight where cars can be stored and fuel, tires and supplies can be bought. Also a supply house in the town.
- 32.8 Wheeling, W. Va. Hotels—McLure, European, \$1 and up, 250 rooms; Windsor, European, \$1.50 and up, 200 rooms; Stamm, American, \$2 and up, 65 rooms. Garages—Seven where cars can be stored; eight where fuel, tires and supplies can be bought. Also two supply houses.
- 72.4 Zanesville, Ohio. Hotels—Clarendon, American, \$2.50 to \$4; Rogge, American, \$2.50 to \$4.
- 55.7 Columbus, Ohio.
- 43.4 Springfield, Ohio. Hotels—Arcade, European and American, \$1 and up, 120 rooms; The Bookwalter, European and American, 75 cents and up, 150 rooms.
- 23.4 Dayton, Ohio. Hotels—Algonquin, Atlas, Beckel, Giddings and Phillips.
- 39.8 Richmond, Ind. Hotels—Westcott, European, \$1.50 and up, 125 rooms; Arlington, European, \$1 and up, 75 rooms. Garages—Five where cars can be stored and fuel, tires and supplies bought.
- 68.8 Indianapolis, Ind.
- 70.4 Terre Haute, Ind. Hotels—Several offering suitable accommodations.
- 66.0 Effingham, Ill. Hotels—Fleming, European or American, 40 rooms; Pacific, 75 cents and up, 75 rooms. Garages—Five where cars can be stored, one where fuel, tires and supplies may be bought. Also a supply house in town.
- 34.2 Vandalia, Ill. Hotels—Duckmann, American, \$2 and up, 50 rooms; Metzger, American, \$1 and up, 40 rooms. Garages—Three where cars can be stored and where fuel, tires and supplies can be bought. Also a supply house in town.
- 72.9 St. Louis, Mo.
- 124.1 Mexico, Mo. Hotels—Hoxsey, European, \$1 to \$1.50; Ringo, American, \$2.25 to \$3.
- 96.9 Marshall, Mo. Hotels—Ruff, American, \$2.25 and up, 40 rooms; Howard, American, \$1.50 and up, 30 rooms. Garages—Three where cars can be stored and repairs made, and two where fuel, tires and supplies can be bought.
- 92.0 Kansas City.
- 97.3 Osage City, Kan. Hotels—Everest, European and American, \$1 and up, 60 rooms; Armand's, American, \$1 and up, 15 rooms. Garages—One where cars can be stored and where fuel, tires and supplies can be bought.
- 120.7 McPherson, Kan. Hotels—Union, European, \$1.50 a day, 60 rooms; Merchants, American, \$1 a day and up, 100 rooms; McPherson, American, \$1 per day, 40 rooms. Garages—Four where cars can be stored, five where fuel, tires and supplies can be bought. Also a supply house in town.
- 32.6 Lyons, Kan. Hotel—Palace, American, \$2.25 per day, 60 rooms. Garages—Three where cars can be stored and where fuel, tires and supplies can be bought.
- 149.5 Dodge City, Kan. Hotels—Harvey House, American, \$3 and \$4 per day; O'Neil, European and American, \$2 per day, 50 rooms. Garages—Three where cars can be stored. Three also where fuel, tires and supplies can be bought.
- 103.6 Syracuse, Kan. Hotel—Sequoia, American, \$3 and \$4.
- 112.0 La Junta, Colo. Hotels—Harven House, European, \$3 and up, 40 rooms; Sherman, \$1 and up, 45 rooms (rooms only); Park, European and American, \$1.50 per day, 22 rooms. Garages—Three where cars can be stored and where fuel, tires and supplies can be bought.
- 91.3 Trinidad, Colo. Hotels—Cardinas, European, \$2 a day and up, 200 rooms; Columbian, American and European, \$1 a day and up, 300 rooms; Toltec, European, 75 cents and up, 100

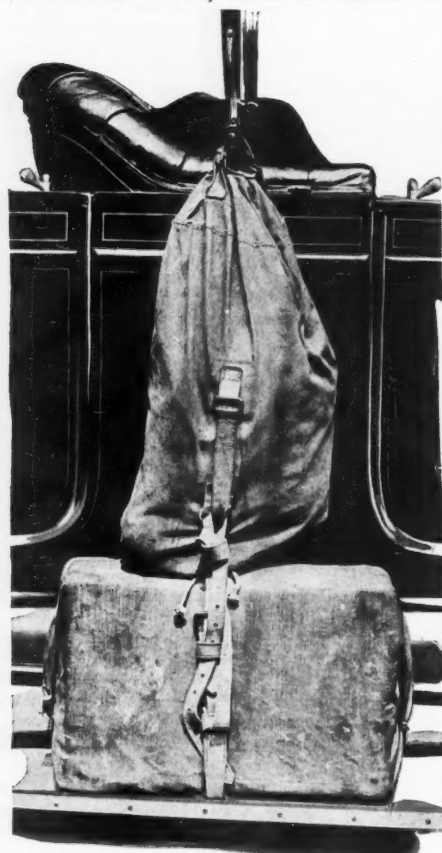
Inter.
Dist. Town or City

- rooms; Hazeldine, American and European, \$1 and up, 90 rooms. Garages—Three where cars can be stored and three where fuel, tires and supplies can be bought.
- 24.7 Raton, N. M. Hotels—Seaberg, European, 100 rooms; Palace, European, second class; English Kitchen, good place to eat and convenient. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought.
- 114.2 Las Vegas, N. M. Hotels—Castenata, American, \$3.50 and up; 44 rooms; La Penslon, 75 cents and up (no meals served), 50 rooms; Troy, 50 cents and up, 24 rooms (no meals); Eldorado, \$1 and up, 20 rooms (no meals). There are also four good restaurants where meals can be had for 25 and 50 cents. Garages—Four where cars can be stored and three where fuel, tires and supplies may be bought. The next points east and west where the tourists can obtain hotel and garage accommodations are: East, Springer, N. M., and west, Santa Fe.
- 75.0 Santa Fe, N. M. Hotels—Montezuma, American, \$3 and up, 150 rooms; DeVargas, American, \$2.50 and up, 100 rooms. Garages—Four where cars can be stored and where fuel, tires and supplies can be bought. Also a supply store in the town.
- 62.9 Albuquerque, N. M. Hotels—Alvarado (Harvey House), American, \$4 to \$6, 75 rooms; The Combs, European, \$1 and up, 60 rooms; Sturgis, European, \$1 and up, 50 rooms. Garages—Six where cars can be stored and five carrying fuel, tires and supplies. Also there is a supply house in the town.
- 78.0 Socorro, N. M.
- 23.8 Magdalena, N. M. Hotels—Wilson, American, \$3, 50 rooms. Garages—Four where cars can be stored and where fuel, tires and supplies may be bought.
- 130.4 Springerville.
- 132.6 Winslow, Ariz. Hotels—Harvey House, European, \$1.50 per day and up, 24 rooms; Palace (rooms only), \$1 a day, 15 rooms; Navajo, American, \$1.50 and up, 25 rooms; Bradford, \$1 a day, 20 rooms. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought. One fireproof, open all night, and carries line of parts.
- 63.0 Flagstaff, Ariz. Hotels—Commercial, European, \$1 a day and up, 40 rooms; Ideal, European, 50 cents and up, 25 rooms; Weatherford, European, \$1 to \$2 a day, 25 rooms. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought. Also a supply shop.
- 34.9 Williams. Hotels—Fra Marcos, European, \$2 and \$3; Grand Canyon, European, \$1 and \$1.50; Cottage, European, \$1.
- 19.4 Ashfork. Hotel—Escalante, American, \$4 and 5.
- 119.0 Kingman, Ariz. Hotels—Beale, European, \$1 and up, 50 rooms; Brunswick, European, \$1 and up, 50 rooms. Garages—Three where cars can be stored and where fuel, tires and supplies can be bought. The nearest points east and west where tourists can obtain hotel and garage accommodations are: East, Seligman, and west, Needles, Cal.
- 72.0 Needles, Cal. Hotels—Arataba, European, 75 cents and up, 70 rooms; El Garces, European, \$1.50 and up, 35 rooms; Monarch, European, \$1 and up, 15 rooms.
- 165.8 Barstow, Cal. Hotels—Harvey, European and American, \$2 and up, 20 rooms; Inez, lodging only, 50 cents and up, 20 rooms; Barstow, lodging only, \$1 to \$2, 30 rooms. There are two restaurants in Barstow. Garages—Two where cars can be stored and where fuel, tires and supplies can be bought. Also a supply house. The nearest points east and west where the tourist can obtain hotel and garage accommodations are: East, Needles; west, Victorville.
- 79.3 San Bernardino, Cal. Hotels—Roanoke, European, \$1 and \$1.50; Stewart, American and European; Sunset, European, 75 cents to \$2.50.
- 63.0 Los Angeles, Cal.



PREPARING the motor car for a transcontinental tour and packing luggage and spare equipment for the long trek across prairie, mountain and desert is as pertinent a factor in a successful journey as it was in the days when Buffalo Bill rode as a scout over the Overland trail in advance of the white-topped prairie schooners and Stephen B. Elkins walked beside a mule train in the dust of the Santa Fe trail.

In the days of rich and romantic trade with the southwest, when the Santa Fe



HOW DUFFLE BAGS MAY BE STRAPPED TO THE TOP BOWS

By Harry A. Tarantous

NECESSARY CAR EQUIPMENT FOR A TRANS-CONTINENTAL TOUR

Set of four tire chains
One axe
Two canvas water bags
One canvas water bucket
Five feet ignition cable
Five feet lighting wire
Radiator meter or radiator coil
Two extra casings and two tubes
Tire repair kit including vulcanizer
Block and tackle or hub drum or winch
Fifty feet of 3/4-inch rope
Fire extinguisher
Spare rear axle shaft
Few burlap bags
Spare spring
Oil lantern
Shovel
Wooden plank, 4 ft. long by 2 inches by 10 inches
Small blocks of wood
Three 1-gallon cans of oil
One 5-gallon can of gasoline
Complete set of tools including: Gas-kets, washers of all types and sizes, nuts, bolts, two monkey wrenches, one very large, one small, three different size chisels, three different files, set of spark plugs, two jacks, etc.

trail was a road to wealth trod by gentlemen adventurers and red-blooded pioneers, the packing was so important that a crew of men, especially trained for such a job, was employed. The duties of these men were to unload the mules at night when camp was pitched and to repack the animals each morning. In those days, packing was a science. To strap several hundred pounds of merchandise on a mule's back so securely that it would not fall off when the animals were stampeded by attacking Indians or when the train went through steep and narrow mountain passes almost approached a fine art.

Prairie schooners no longer rumble over

the trails to the Pacific coast. The imprint of rubber tires has replaced the imprint of mule's feet in the dust of the Santa Fe and Overland trails, but many motorists would welcome the assistance of one of the old-time drivers and a pioneer packer in preparing his car for the journey.

But our pioneers had no valves to grind, no tires to patch, no gears to lubricate before they undertook a 30-mile-a-day journey across the prairie. Perhaps the wagon axles needed a little grease or one of the mules or horses a new shoe, but further than such minor preparations relating to things mechanical, the travelers of '49 had none to make.

Success Depends Upon Preparation

Thirty-five years has changed conditions and today, instead of spending a day making preparations and perhaps 90 days on the road, the motorists works faithfully for a few days and spends less than one-fourth the time in traveling that the '49ers used. Lincoln once said something about studying hard in order to be prepared for a difficult job, for some day it might come; and while a homely analogy, this same spirit should be imbued in the transcontinental tourist because only with



BLANKET ROLLS MAY BE CARRIED IN THE TONNEAU IF IT IS VERY ROOMY

the proper preparedness can a long journey over all kinds of roads be successful from the standpoint of pleasure and time consumed. Be prepared.

Tuning the car so it will be in fit shape for its knock-about trip across mountains, through sand, over rocky roads and up and down grade, means more than merely glancing at the tires and turning up the grease cups. The car may not need overhauling, but it certainly should not be expected to make a 3,000-mile trip without trouble, unless a reasonable amount of attention has been given it at the start.

The First Essential Steps

If the motorist is unfamiliar with tuning a car to its highest efficiency, the local garage or service station should be given the job, with instructions to add to the regular work: a complete inspection and tightening of parts. The tightening of a spring clip before the journey may save a spring on the road. The motor supports, the radiator fastenings and every nut on the car should be tightened. Keep in mind, nothing may happen, no parts may be lost, but to be safe, all parts should be inspected. All gearcases and the motor crankcase should be filled with clean oil and every grease cup filled and turned up. Such parts as the magneto, lighting generator and starting motor should be covered, preferably with a leather housing, to prevent the entrance of water and dirt. In some cases this may be rather difficult to do, especially in the case of the starter which sometimes is located under the front floorboards. It will repay the motorists in instances of this sort to have a special covering made for the unit.

To keep the car moving is important, but to hold it on a steep grade is more important, hence brake efficiency should be at its highest. New brake bands may be needed and, if at all in doubt about



HOW ROPE COIL AND LANTERN MAY BE CARRIED. NOTICE THE GASOLINE TORCH IN THE COIL

the serviceability of the bands, take the safe side and purchase new lining. In past trips it was found that in the mountains the brakes needed adjusting at least once each day and in some instances two and three adjustments were necessary in order to cause the bands to hold firmly on a steep grade. Know how to make brake adjustments.

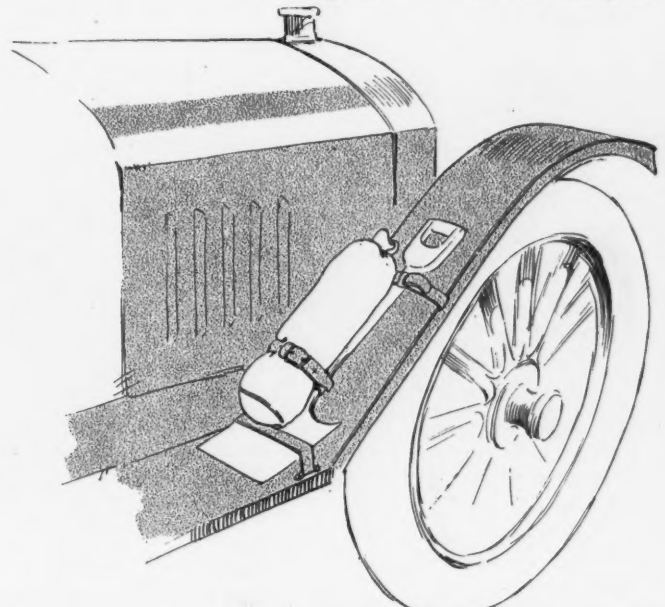
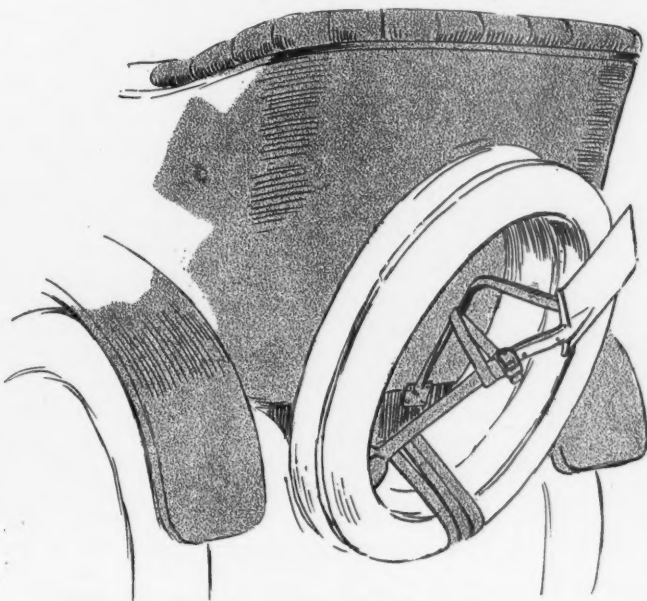
There are two other important parts which may require attention—the radiator and the carbureter. The former should be fitted with a meter of some type which registers the temperature of the cooling water, or a coil of pipe with the end in plain view of the driver. Water overheating is a common ailment and the sooner it is detected the less trouble will be encountered later. As soon as a large volume of steam issues from the radiator coil the driver knows the water is boiling. In the case of the meter, he can read the temperature of the water.

One should become familiar with the carbureter adjustments. All ignition and lighting wires should be inspected for insulation breaks, all terminals tightened and the battery, of course, brought to level with distilled water. No additional battery water need be carried, for there are many places along the route where sufficient may be obtained for replenishment.

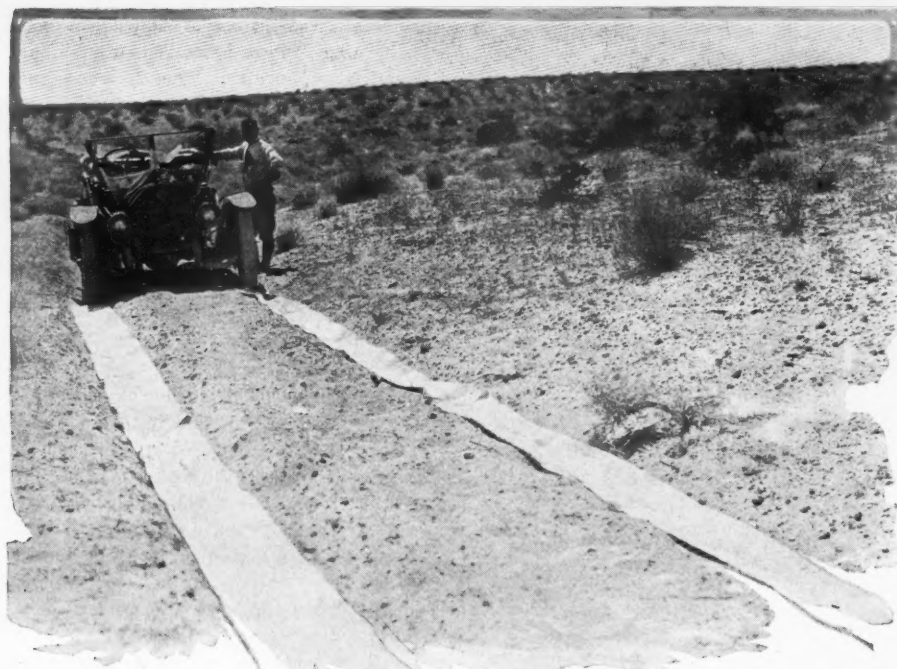
If there is nothing seriously wrong with the car or if the owner has not discovered in it, some imaginary ailments, the work of preparation as

outlined above, should not take more than a day.

The word preparation, however, means more than merely getting the car mechanically fit for tour; it means also fitting it with the proper tools and equipment for use in emergencies. The more time and energy spent in properly inspecting and tuning the car before the start, the



IF IT IS NOT POSSIBLE TO OBTAIN A FOLDING SHOVEL IT WILL BE DIFFICULT IN SOME CASES TO FIND A SUITABLE PLACE FOR THE ORDINARY TYPE. THE ABOVE ARE TWO SUGGESTED LOCATIONS



LONG STRIPS OF CANVAS ABOUT 12 INCHES WIDE WILL FIND EXCELLENT APPLICATION IN THE SAND

fewer tools will be needed to burden the car on the road. A complete list of car equipment would fill two of these pages but many parts may be forgotten if strict adherence is made to the few suggestions given previously, regarding tuning and inspection. Indeed, the weight of the car's additional equipment alone would be a big item, if the inspection were overlooked.

Before preparations for a transcontinental trip are made, the prospective tourist naturally asks himself a number of questions. What trouble shall I expect on such a journey? How can I overcome these difficulties and what tools will be needed for doing the work? Shall I expect broken axles, or what not? The answer is, expect no such trouble, but know your car and knowing it you will drive forth calmly and unaware that the motor is firing.

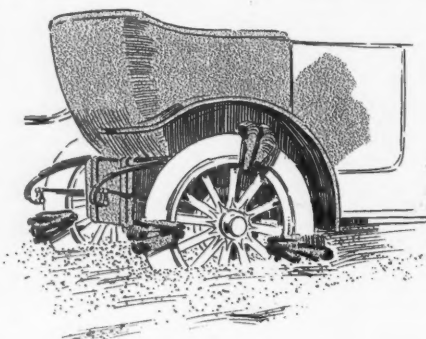
In his pre-tour dilemma the motor-traveler of today sees innumerable delays because of mud-holes, miniature sand pits, infant mountains, etc. and wonders how he, the inexperienced motorist, can take his wife and children through it. But this apparition of trouble following the motorist through the west can be banished easily. Of course, you cannot expect to get such thoughts out of your mind without spending a little money on equipment and here you must fall back on the local supply store.

Oil and Water Supply

Knowing beforehand that runs of 50 miles or more will be necessary without being able to get radiator water, oil or gasoline, it is obvious a supply of these may be necessary, because the extreme hot climate and mountain climbing, soon cause a water shortage and increase the oil consumption to some extent. Two 1-gallon cans of oil will be sufficient and

one 5-gallon can of fuel. These cans should be strapped firmly to the running board with metal straps. This is a convenient way of carrying the cans but in many instances a more suitable out-of-the-way place may be found. As to water it has been found that canvas water bags are better than any other type.

These water bags are sold in 1 to 5-gallon sizes and past experience has proven that a most convenient place to fasten them is the top brackets or a windshield support. The canvas, being porous, allows the inner water to seep through and thus there is evaporation which is accompanied by a drop in temperature. Hence, even in hot weather the water always will be cool. The same method



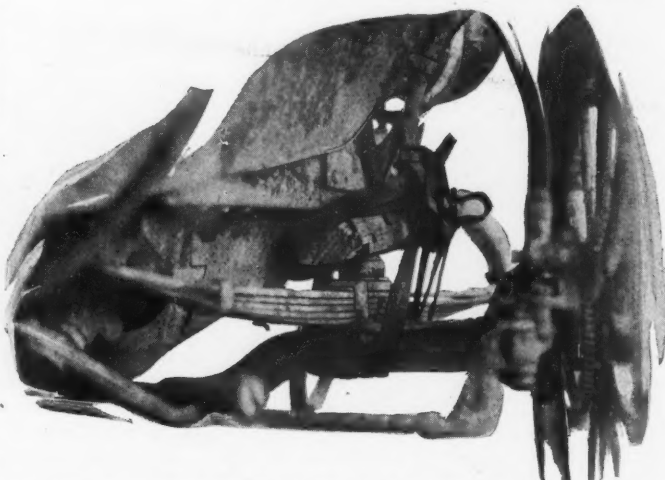
ROPE TIED AROUND THE TIRES WILL BE FOUND EFFECTIVE IN SAND

is used by water carriers in very hot climates, but instead of using canvas they use porous clay vases. As an accessory to the water bag, water buckets are suggested. These are canvas affairs which may be bought at the supply store and are used to carry water from a stream or lake. When empty both bag and bucket may be folded so as to take up little room, and then as soon as is possible the bags should be refilled.

Car Extraction Methods

It hardly is possible that any long-distance tourist will overlook a block and tackle, and a hub drum or winch for extracting the car out of the mud or sand may be useful. If a block and tackle is carried, the block should be of small size and made of metal. The wooden ones are too cumbersome. Winches are desirable, but a study of the subject brings one to the conclusion that a hub drum is the smallest and most efficient tool for extraction purposes. A difficulty arises, however, as in some cases, an attachment is not possible. This is especially true of cars with flat hub caps.

When the hub drum cannot be attached



REPAIR OF BROKEN SPRING. THE CAR SHOULD NOT BE DRIVEN FAST AND STRAPS INSPECTED FREQUENTLY

the block and tackle is to be preferred. All three of these devices are used with wooden stakes. In the case of a car fitted with a hub drum the stake may be driven into the ground either to the side and forward, or at the rear, of the car and some distance from it. The rope supplied with the drum is attached at one end to the stake and at the other to the drum. The driver then attempts to start the car and the spinning wheel winds the rope on the drum and pulls the car out. With the stake behind the car the latter is pulled out backwards.

The motorist should familiarize himself with the use of whatever extraction equipment he takes before he starts out on the tour. Besides the tool equipment mentioned for getting the car out of a tight place, use may be made of burlap bags or rope. The burlap bags when not in use form a means of carrying some of the other equipment. The bags or rope us-

ually are used for sand trouble. The rope or burlap is wound around the tires so as to form as many lumps as possible. As soon as the wheel spins the lumps catch on the ground and so give traction.

Some accessories often necessary for this mud-hole battle are an axe, a board about 2 inches thick, 10 inches wide and 4 feet long, a crowbar about 5 feet long and of $\frac{3}{4}$ -inch diameter, about 50 feet of $\frac{3}{4}$ -inch rope and a shovel. These parts never may be used but it is safer to carry them. The axe is used for driving stakes into the ground and for cutting brush or branches from trees to place under the car wheels to obtain traction. The board is used in case there are no trees or brush around and in this case the plank is placed so that any movement of the wheel will tend to cause it to mount the board. The crowbar may come in handy in a number of tight places, especially when a strong part is needed to get a leverage. The use for the shovel is obvious when the car is stuck in the mud or sand.

Driving in the Sand

There is one point which must be remembered when such conditions as above arise. When the driver finds his car in the sand he should not attempt to get out by spinning the wheels. That will only cause the car to sink further into the sand. Deflate the tires and use the burlap bags or the rope around the tires or try to mount a wheel on a wooden plank. These are alternatives for the hub drum and other tools.

A careful driver will watch the road and if a bad spot is seen the car stopped and brush spread over the bad road surface. On the ordinary roads, should they be wet, tire chains should be used and preferably on all four wheels. Steering becomes much easier under these conditions and much safer, for the wheels will turn where they are directed.

The car equipment mentioned never may be used, but as stated often, be on the safe side. Some may consider the parts listed as superfluous equipment and pay more attention to the remainder, such as tires, the tool kit, etc.

Tires should not worry one and it is suggested that two spare casings only be taken. These should be new and fitted with new inner tubes. As tire accessories, a vulcanizer of either the gasoline or steam type would be desirable together with some patches of various sizes. In many of the transcontinental tours of the past the drivers operated the tires under-inflated in order to make for easier riding. This brings up the subject of tire pumps and it seems unnecessary to say, use a power-driven pump instead of a hand pump. On a scorching hot desert 5 minutes' work with a hand pump will make one feel extremely tired as if he had



HOW A HUB DRUM IS USED IN EXTRACTING A CAR FROM THE MUD

completed a day's labor on the highway.

Speaking of hard work, brings up the act in which the driver and a couple of passengers start to replace a broken semi-floating axle shaft. In a floating axle this should not take more than 10 minutes—just slip one shaft out and a new one in—but with a semi-floating it means many hours' work. But why speak of broken axles? And not a word has been said about taking along an extra shaft. Axle shaft breakage is not common, but it is another one of those rare instances where "be on the safe side" enters into the matter. The new parts will not take up very much room. Springs. There's another subject, which likens to the axle story. Springs can break, that's certain and to have an extra spring in the car is to be that much more at ease. Axle shafts and springs may be carried under the body and so not interfere with the carrying of food or the more needed articles.

In the event that road trouble prevents the car from being driven into a town before nightfall, work must be done in the dark and an oil lantern is a handy part of the equipment for this work. A small electric trouble lamp will be desired when tool finding is necessary which leads up into the tool kit equipment. No one can foretell just what trouble will be encountered and hence the greater number of tools carried, the more certain one will be that a repair can be made.

As a reminder, the following are suggested besides the special tools which come with the car: A variety of nuts, bolts, gaskets, and cotter pins, two pairs of pliers and a wire cutter, two monkey wrenches, one a very large one, and two or three files, a mill, a magneto file and a coarse one, a roll of insulation tape, a roll of cord and one of stout copper or iron wire.

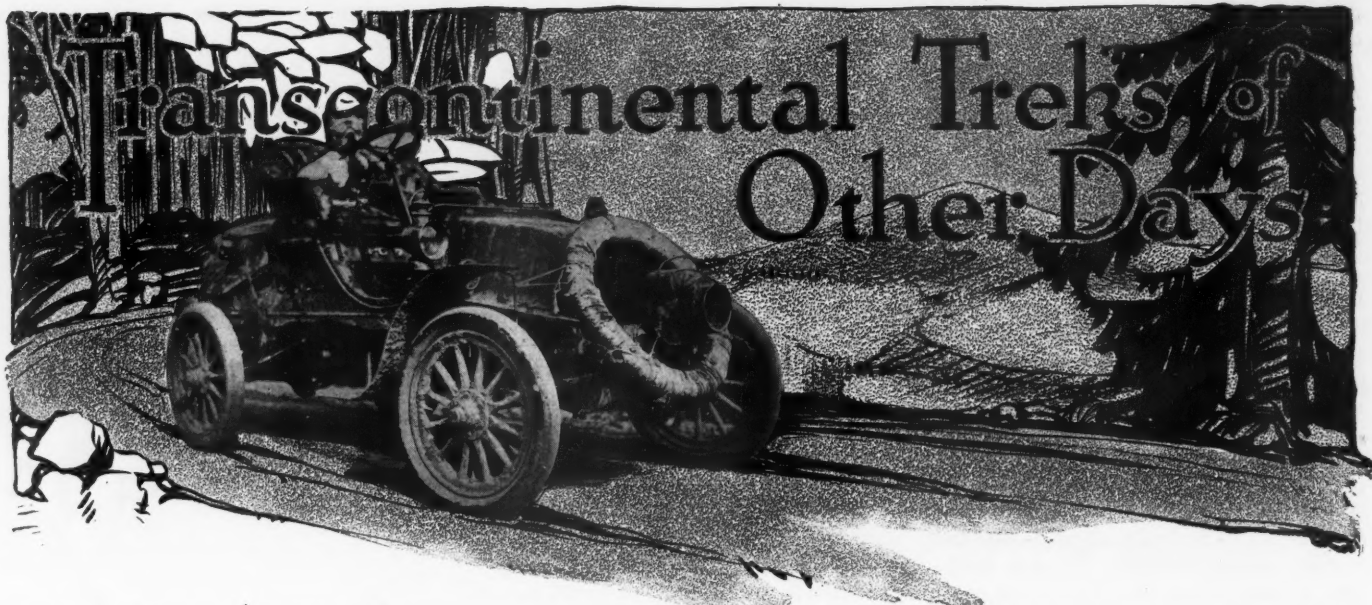
Checking Up Tool Equipment

Then there are others such as spark plugs, an extra set of which will do, washers of all kinds and sizes, a complete valve assembly including springs, seat, valve and pin, wrenches of different sizes and types—socket and flat, and about 5 feet of high-tension ignition cable. The same amount of lighting cable also may be carried. A fire extinguisher will be useful. In other words take as much small material as you can, for no one can tell what part may mean the success of the trip.

With the car equipment checked up, the passenger equipment needs attention and after that the driver may crank the car and head for the coast. In the list of passenger necessities, will be included clothing, first-aid kit, sleeping togs, etc.



AN UNUSUAL PREDICAMENT AND ONE WHICH CALLS FOR MUCH THINKING. THE MOTORISTS ABOVE ARE ATTEMPTING TO BLOCK UP THE WHEEL LITTLE BY LITTLE



FIRST CAR TO CROSS CONTINENT, THE WINTON DRIVEN BY DR. JACKSON—AT THE WHEEL IS THE DOG WHICH CAME NEAR BEING EATEN BY THE HUNGRY TOURISTS

NOWADAYS, when a transcontinental trip from the Atlantic to the Pacific has become such a commonplace achievement that it receives only passing mention, when it takes a round-the-world tour to arouse any general interest, it is difficult to realize the intrepidity of those hardy motor pioneers who blazed the trails from ocean to ocean. Twelve years ago, the crossing of the continent by motor car was a feat yet to be accomplished and one which was considered not only dubious as to results, but exceedingly hazardous as well.

In the final years of the last century, several serious attempts were made to drive a car from New York to San Francisco but none of them was successful. One of the first of those recorded was the attempt of J. D. Davis and his wife in 1899 to cross the continent in a Duryea. Alexander Winton about that time set out in one of the first Wintons from the Golden Gate, bent on reaching New York overland, but failed to complete the trip.

Commenced with a Rush

Transcontinental touring in America, when it did start, commenced with a rush. This was in 1903. There were four

By Darwin S. Hatch

parties making the attempt at the same time, one of them on a motorcycle.

On July 17, 1903, Dr. H. N. Jackson and S. K. Crocker rolled into New York after a trip of 64 days, driving a Winton which left San Francisco June 20 amid the dark forebodings of the meager motoring fraternity and positive statements of mountaineers that the thing never

would be possible till cars had wings.

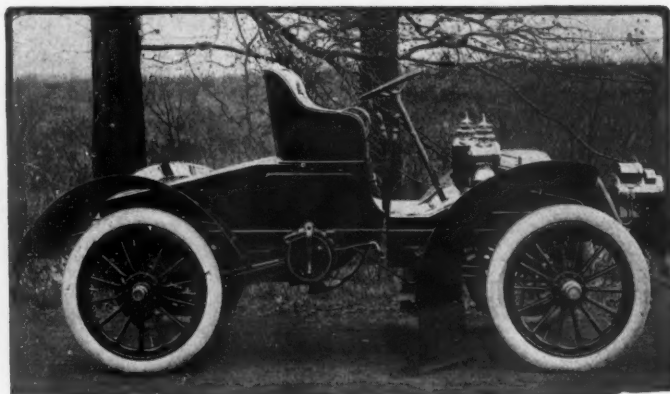
Were it possible to reprint from the pages of Motor Age of that summer the chronicles of that first pioneering trip across the Sierras of California, through the forests of Oregon, over the Rockies of Idaho and the alkali plains and cattle country of Wyoming; the mud fights in the buffalo wallows of Nebraska and the thousand and one experiences with which those 9 weeks of mud and sand were crowded, it would provide a story as replete with thrills as the most blood-thirsty penny-a-liner. If that original cross-country gasoline cruise could have been recorded on celluloid film, it would have the "Perils of Pauline" and her kindred of the movies backed off the screen.

Motorcycle Was First

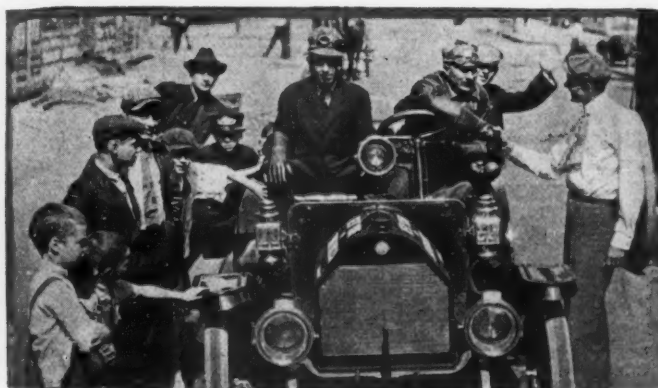
Though the Winton was the first motor car to cross the continent, a shade of the hard-earned glory was lost to Dr. Jackson and his associate, by the fact that the week before he finished, a young motorcyclist named Wyman, completed a successful, if arduous trip from the Golden Gate to Manhattan. Wyman was the first to pilot a motor-driven road vehicle the breadth of the continent.



WHITMAN AND HAMMOND IN THE SINGLE-CYLINDER OLDS



SINGLE-CYLINDER PACKARD LIKE "OLD PACIFIC," IN WHICH TOM WHITMAN AND HAMMOND IN THE REO, WHICH HOLDS TRANS-
CONTINENTAL RECORD



WHITMAN AND HAMMOND IN THE REO, WHICH HOLDS TRANS-
CONTINENTAL RECORD

At the same time that Jackson was plowing across the country in his little Winton, E. T. Fetch and M. C. Krarup in a single-cylinder Packard were following close on the heels of the former, along a route which coincides very closely with what now is the route of the Lincoln highway. They left San Francisco only 3 days behind the Jackson party and arrived in New York 2 days behind the Winton, after a run of 63 days.

Trailing the Winton and Packard and 3 weeks behind the latter came L. L. Whitman and E. J. Hammond of Pasadena, Cal., in a single-cylinder Oldsmobile. They started from the Golden Gate and followed much the same route as the Packard party. Whitman, who later was to smash the transcontinental record three times and who now holds that mark, took a somewhat longer time on this initial trip in the Oldsmobile, checking in at New York 71 days after leaving the Pacific.

The sensation created throughout the country by the passage of these first transcontinental tourists can only be imagined. Whole cities turned out to greet the dust and mud-laden Balboas of the motor car. Schools were dismissed, and business suspended completely. In Oregon and Idaho, the Winton tourists met many people who never had even heard of a motor car. Some of them thought the car was an engine that had run off the railroad track and was going wild across their ranches.

When crossing the desert they were out of sight of human habitation for days at a time. The only signs of life were the occasional emigrant and his family traveling in his prairie schooner. One of these, when he saw the strange object approaching "at lightning speed," and apparently without any method of propulsion, was seized with terror and jumping down from the seat he hastily unhitched the horses and turned them loose. The whole family then got in the wagon and were on their knees praying when the motor car came to a stop. They thought the judgment day had come and they were lost. It took considerable talking to reassure them, according to Dr. Jackson's account of the trip.

At one time in Wyoming the motorists were 36 hours without food. They were in the midst of a trackless desert and had traveled all day and a part of the night without seeing a living creature. Just as they had decided to sacrifice on the altar of hunger the pet bulldog an Orgeon lumberman had given them, they sighted a lonely sheep herder, who gladly killed a young lamb and fed the hungry ones.

Fetch and Krarup in the Packard, which came to be known as the "Old Pacific," likewise encountered experiences which luckily are not vouchsafed present-day tourists. They had to rely upon the half-



CREW OF ALCO TRANSCONTINENTAL TRUCK
IN WYOMING MUD



FIRST TRANSCONTINENTAL FRANKLIN
WITH WHITMAN AT WHEEL

understood and unreliable directions of desert Indians for guidance. They were arrested in an Iowa town because when the car was standing still it scared a

farmer's horse, which wrecked the buggy. Imagine an Iowa farmhorse refusing to pass a car today! Another time it took 3 hours to go 11 miles through the sand.

Transcontinental Records Lowered

With the ice thus broken by the triple achievement of 1903, the mere crossing of the continent ceased to be the matter of excitement it was before, but the next year L. L. Whitman again aroused interest by breaking the transcontinental record in a 10-horsepower two-cylinder Franklin. This was accomplished in 33 days total time, which was less than half the time required for Whitman's previous trip and was almost one-half the time required by the previous record-holder, Tom Fetch. Whitman this time started at New York and finished at San Francisco.

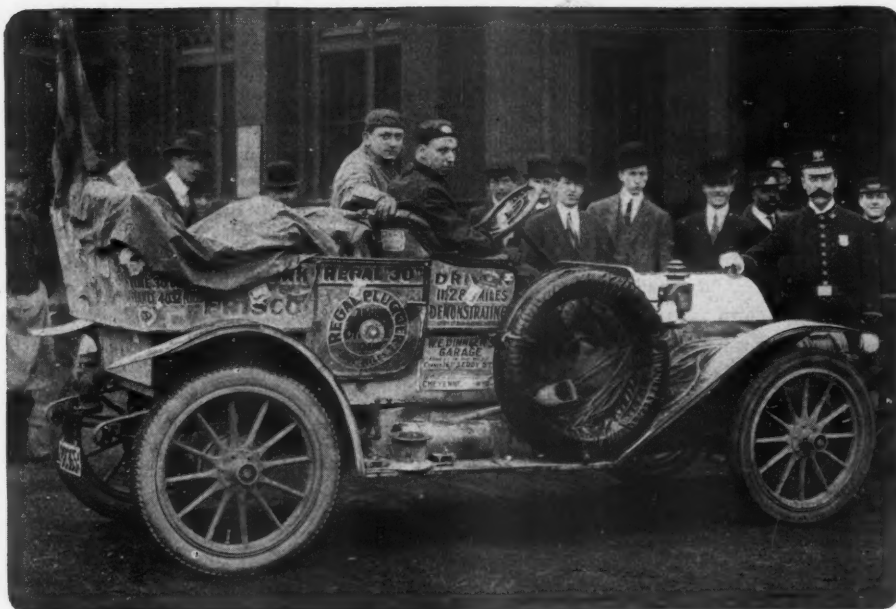
In August, 1905, Percy Megargel, of Rochester, N. Y., and David F. Fassett, of Lansing, Mich., as his companion in a two-cylinder Reo touring car started on a double transcontinental run which proved to be the first there-and-back coast-to-coast run and the longest tour on record up to that time. Megargel, who is now dead, found it necessary to abandon the car for a few weeks in the snow of the mountains on his return trip, getting the car out later and finishing the tour to New York in June, 1906. The party had covered 11,742 miles.

The first car with a tonneau and carrying more than two passengers to have accomplished the transcontinental trip in either direction was the model F Buick, a two-cylinder car carrying Richard Henry Little, C. D. Hagerty, Norman De Vaux and J. C. Whittle from New York to San Francisco. The trip finished in September, 1906, after 24 days of running and set a record for the east-to-west trip.

In 1906 Whitman again started out from San Francisco with the intention of lowering still further the transcontinental record he held. The car used again was



THE FIRST FAMILY TRANSCONTINENTAL TOUR—J. M. MURDOCK AND HIS FAMILY IN
PACKARD



REGAL PLUGGER AT END OF ITS COAST-TO-COAST TOUR

a Franklin, this time a six-cylinder. Instead of driving daytimes and resting nights, as in former runs, the trip was a continuous one, the car being driven night and day by relays of drivers and the run completed in 15 days. Thus the record was cut in two for a second time. This trip was from west to east.

Whitman's last trip, as a record-breaker across the continent, was made in 1911 in a four-cylinder Reo. This also was a night and day run and clipped 5 days off the previous record. This record of 10 days from ocean to ocean across the breadth of the continent still stands. Whitman went from New York to San Francisco.

Up to 1908 no transcontinental trips had been attempted as anything but factory try-outs and publicity stunts. The trip was considered too hazardous and the work too arduous for anything but trained drivers and hardened assistants to make the attempt. But in 1908 a new phase of the transcontinental touring situation was introduced by J. M. Murdock, a motorist of Johnstown, Pa. Murdock not only drove through from Los Angeles to New York and became one of the first owner-drivers to make the trip but he took his family with him and by thus making the first family transcontinental tour established a precedent which is being followed by an increasing number of motorists each year.

First Family Tour

The car which Murdock used was his own 1908 Packard touring car, which previously had been driven 5,400 miles. He took with him his wife, two daughters and his young son. He was accompanied in the car also to Ogden by the veteran tourist Whitman and his mechanic also was carried. The car was stocked with a few extra parts, camping outfit and a small winch and pole, as well as shovels and axes. Murdock even carried a sheet-

iron camp stove. He took the precaution before starting to write ahead to a number of places on the proposed route to arrange for a gasoline supply and the prompt assurances relieved him of the necessity of worrying in regard to fuel at the out-of-the-way points.

Gasoline Worries no Longer

This is a precaution, by the way, which will be entirely unnecessary for those who tour the beaten paths of transcontinental travel this year, because there will be found no place where the normal supply in the tank and a 5-gallon additional supply will not be found amply sufficient.

The Murdock party did a little pioneering on this trip for their trip from Los Angeles as far as Ogden was most of the

way over country hitherto untrod by the wheels of a motor car. They found it necessary to cross the lower edge of the notorious Death valley as well as a great deal of other desert country and encountered a sand storm in the desert which gave them a thrilling if not a very pleasurable experience. Further east in Wyoming they became lost in a blizzard and had to lay up in Laramie for some time to recuperate. The entire party, however, reached New York in good shape after 32 days elapsed time and 25 days running time.

In 1909 there were two transcontinental trips which aroused a great deal of comment. One of these was the trip of the Regal Plugger in which Wilcox drove from New York to San Francisco and the other was the Mitchell Ranger driven by Frank Zirbes, who made a similar trip.

The Regal Plugger started from New York July 5 and made the run to San Francisco in 30 days. This was a four-cylinder touring car, carrying a driver and three passengers and combated with heavy rains and mud through a greater portion of the eastern half of the trip. The feature of the performance of this car was that at the time it was decided to make the run none of the 1910 models had been built by the Regal factory.

On June 28 it was decided to run the car through and to make the start from New York on July 5. The factory was wired from New York to this effect and immediately started to build this first 1910 model. The car was finished 2 days later, expressed to New York, arriving on July 4, the start being made at noon the next day. The car had not had any test whatever in Detroit and up to the time it started from Broadway had been run less than 5 miles.



ABBOTT BULLDOG ON 1911 TOUR—IN FRONT OF LEADING HOTEL OF SANCHEZ, MEX.

The Mitchell Ranger run was characterized by having quite a military flavor, inasmuch as the entire trip was under the inspection of military authorities as represented by Lieutenant Rosenthal and Private Parrott, who bore dispatches from General Wood at New York to General Weston at the Presidio, San Francisco. Army officials and military authorities in general pronounced themselves as well pleased with the showing made in this trip from a military point of view and this probably had considerable to do with the increase in the use of motor cars in the American army.

Women Tour to Coast

At the same time that these two cars were crossing the continent another run of an unusual nature was being made. This was a party of four women from New Jersey who made the entire cross-country trip in a 30-horsepower Maxwell touring car, unaccompanied by any of the masculine sex and relying entirely on their own resources in extricating themselves from the difficulties which were inevitable in an ocean-to-ocean tour at that time.

The party consisted of Mrs. John R. Ramsey, Mrs. N. R. Powell, Mrs. N. W. Atwood and Miss H. Jahns, all of Hackensack, N. J. Heavy rains through Iowa and Nebraska and parts of Wyoming made very heavy going and still further west washouts held them up a number of times and necessitated long detours. Aside from these delays, no difficulties were encountered.

This exploit was duplicated the year following when two feminine tourists, Miss Blanche Scott and Miss Phillips, made the coast-to-coast trip from New York to San Francisco in an Overland roadster. No attempt at setting a record was made, the party making side trips to interesting points. Miss Scott made all her own repairs even to the repair of a spring that was broken when a bridge gave way under the car.

By 1910, transcontinental tours had become so commonplace that some special stunts had to be incorporated with the trip to arouse any comment. One trip which gained recognition was that of



A. L. WESTGARD, VETERAN TOURIST, AND HIS PATHFINDER—NOTE DESERT WATER BAGS HUNG ON TOP IRONS

Fred D. Clark in the Ohio Mud-Hen. This was a pathfinding trip and was the first tour around the United States. The car started in November, of 1910, from New York and took a southern route through Georgia, Texas, New Mexico, Arizona and then up the west coast, returning over a route that approximates what now is the Lincoln highway.

Coast-to-Coast Loses Terrors

It was in 1911 that transcontinental touring received an entirely different aspect. Previous to that year the dangers and discomforts and the rough going had been played up to a greater extent than had the pleasurable part of the journey. There were three reasons for this. The chief one was that most of the tours were made by factory cars and naturally the obstacles to be overcome were placed in the limelight in order to show the stamina of the cars. Another reason was that rapid improvement in the cars, by which, conditions that were difficult for earlier models did not affect the later ones with their greater power and stamina. Another reason was that with the growing wealth and population of many sections the increased traffic, and the greater use of motor cars, much roadwork was done and

many supply stations and garages established, so that motoring was not nearly the hazardous proposition it formerly had been.

Premier Ocean-to-Ocean Tour

For general recognition of these facts, most credit is due to the Premier ocean-to-ocean tour, arranged by John Guy Mopihan. Twelve Premier touring cars, carrying a party of forty, and most of them driven by their owners, made a leisurely sight-seeing tour from Atlantic City to Los Angeles in the summer of 1911. There were twenty-six men, ten women and four children. There was no trouble of any magnitude encountered, no illness en route and the physical condition of the members of the party was better at the end than at the beginning. The object of the tour was to prove the feasibility of a transcontinental route for amateur car owners—and incidentally obtain publicity for Premier cars. In both objects it was successful. A Premier truck accompanied the party as a baggage car and came through with the rest.

Another transcontinental run in which a commercial car figured was that of the Saurer truck, which made the trip across the continent to show its economical and



PREMIER OCEAN-TO-OCEAN OWNERS' TOUR—TWELVE CARS AND A TRUCK

reliable operation in an extended trip over rough country.

The pioneer of commercial transcontinental service was the Alco truck which in the summer of 1912 carried a 3-ton load of soap from Philadelphia to San Francisco. The trip was made to deliver the soap from the manufacturer to a concern in California which had ordered it. Over 4,000 miles was covered and the trip required 90 days.

Transcontinental Races

In addition to these tours, a trip across the breadth of the American continent figured in two races. One of these was the New York-to-Seattle race, run in June, 1909, in connection with the Alaska-Yukon-Pacific exposition. Six cars started—two Fords, a Shawmut, Itala, Acme and Stearns. Ford was the first to finish at Seattle, having made the trip in 22 days. Later, however, the Ford was disqualified on the charge of having changed an engine on the journey and the trophy was awarded to the Shawmut.

Most attention was attracted by the progress of the New York-to-Paris race, which started from New York in February, 1908, and included a run to the Pacific coast. The race was won by the Thomas Flyer, representing America, and which reached Paris in 169 days, the dis-

tance being estimated at 20,000 miles. The Protos, representing Germany, reached Paris 4 days ahead of the Thomas, but its



MISS SCOTT AND MISS PHILLIPS IN THEIR TRANSCONTINENTAL OVERLAND

claim was not allowed because of the car having been shipped by freight to Seattle, Wash.

In the list of veteran transcontinental tourists must be mentioned one who has made no less than ten trips from coast to coast in addition to innumerable tours which did not have the two oceans as their termini. This is A. L. Westgard,

vice-president of the National Highways Association and director of transcontinental highways for that association.

Westgard's initial transcontinental tour was made in the fall of 1910 in a Premier laying out the Trail to Sunset. This was the first trip made in this country for the purpose of gathering touring data from the Atlantic to the Pacific, and arousing interest in the improvement of transcontinental highways. The next spring, Westgard piloted the Saurer truck over the Trail to Sunset, as told more in detail on other pages.

First Passenger Service

During the fall of the same year, Westgard piloted the first motor trip across the continent carrying passengers who bought a through ticket. This was promoted by the Raymond-Whitcomb Tourist Agency and five Garford cars were used. This was the forerunner of what probably will be a regular service in time, and which may begin this summer.

In the succeeding 3 years, Westgard opened up the Northwest trail, Overland trail, Midland trail in a Pathfinder, covered the Overland and Midland trails with the Indianapolis-to-the-coast tour and the Oregon trail, the Old Trails road, Borderland route and eleven others in a Premier.

Louis Chevrolet Accepts Mount at Indianapolis

Veteran to Be at Wheel of Cornelian in 500-Mile Race

INDIANAPOLIS, Ind., Feb. 24—Announcement by the speedway officials of the entry in the 500-mile race, May 30, of the Cornelian to be driven by Louis Chevrolet possesses a special interest in that this little car will be the smallest that ever competed in the speedway classics. The whole car weighs but 1,000 pounds and has a displacement of only 103.8 cubic inches, just over one-third of the limit. The motor weighs less than 190 pounds and rates, according to the S.A.E. formula, at 12.1 horsepower at 1,000 feet per minute piston speed.

This car is made by the Blood Bros. Machine Co., Allegan, Mich. and made its debut as a racer in the 100-mile race at Kalamazoo last fall, finishing seventh in a field of thirteen with a driver and mechanic neither of whom had seen the car 20 minutes before the start. The

Indianapolis entry is almost a duplicate of the Kalamazoo entry and is said to be of the same design and construction as the regular factory product except in a few particulars designed for speed.

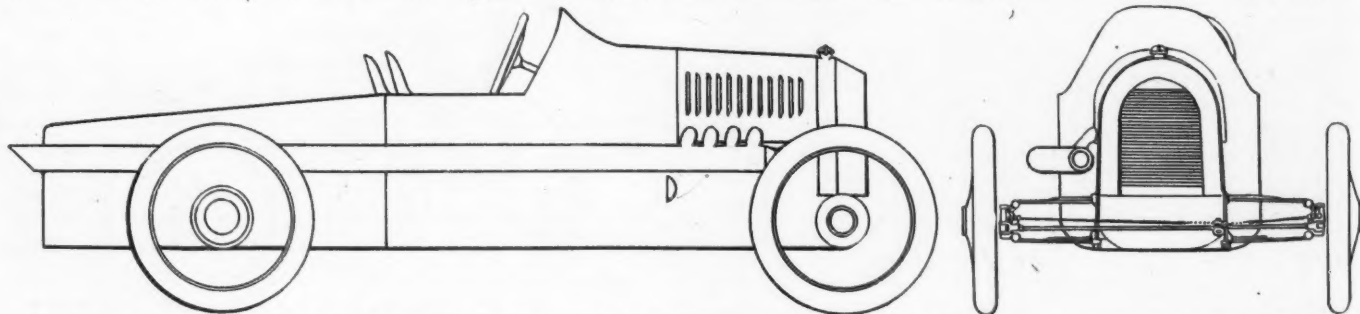
The motor is a four-cylinder Sterling valve-in-head type, 2 $\frac{7}{8}$ by 4 inches in size. Valves are 1 $\frac{1}{4}$ inches in diameter and the pistons are of a special aluminum alloy. The motor is capable of a speed of 3,500 r.p.m. and the gear ratio is 2 to 1. Tires are 30 by 3 $\frac{1}{2}$ inches instead of the 28 by 3-inch tires used as stock.

There are three unique features of Cornelian stock construction which also have been incorporated in the racer. One of these is the rear axle. This is a flexible axle, much like that of the de Dion. This involves the use of four universals in the axle. The differential and bevel gears are mounted on the chassis and

are carried on the springs so that unsprung weight is a minimum. Each wheel is independent of the other and does not carry the dead axle weight. The contention of the designer, Howard Blood, is that this gives a construction which can be driven at high speeds without bounding or jumping.

Another feature of the Cornelian is its suspension, the front axle being provided with two transverse half-elliptic springs. The rear suspension comprises a three-spring transverse, half-elliptic platform. In the body there is another innovation, a single sheet-steel shell comprising both body and frame.

Louis Chevrolet, who is to pilot the car at Indianapolis, was famous as a racing driver until he retired in 1910, reentering the field recently when he competed in the last desert road race.



SIDE VIEW SHOWING GENERAL LINES OF THE CORNELIAN, ENTERED IN THE INDIANAPOLIS RACE; ALSO FRONT VIEW SHOWING UNUSUAL FORWARD SUSPENSION

Rain Forces Postponement of Vanderbilt Cup Race

Classic to Be Run March 6; Grand Prix Next Saturday

By Al. G. Waddell

SAN FRANCISCO, Cal., Feb. 23—Special telegram—After sitting on damp grand stand seats for more than 2 hours hoping that the threatening clouds would vanish, giving the sun a chance to dry the exposition race course, 100,000 people filed out of the gates under shelter of umbrellas and there was no Vanderbilt cup race today.

For a month the weather conditions have interfered with the plans of the exposition race committee. On the day set for the opening practice the course was a sea of muddy water. The drivers assembled and waited day after day for a chance to try out the course. Thousands of dollars were spent in an attempt to prepare the course and insure against the threatening weather, but a final storm resulted in the postponement of the classic.

It was at first announced that the Vanderbilt was postponed indefinitely, but later this afternoon it was stated by race officials that the grand prix would take place February 27, according to schedule, and 1 week later, March 6, the Vanderbilt would be held.

This announcement caused a storm of protests from two sources. The officials of the Venice grand prix, who have guaranteed a purse of \$8,000 with all net profits to go to the drivers, set up a wail on the grounds that their practice starts March 7 and to postpone the Vanderbilt until it interferes with the Southern California race is a rank injustice.

Drivers Are Complaining

The drivers also gave way to murmurs of discontentment and started a petition requesting that the Vanderbilt be run at a date previous to February 27.

Barney Oldfield told Chairman Kennerdell that if there was not some change made in the present schedule there would be a rebellion among the drivers. Oldfield stated that his contract expires with the Maxwell team on the night of February 27, after the grand prix, and he will leave this city the next day unless the San Francisco race officials pay all his hotel and other expenses caused by the postponement.

Several of the most prominent drivers entered here went so far as to suggest that the Vanderbilt be transferred from the slow San Francisco course to Venice, Santa Monica or Corona, leaving but the grand prix for San Francisco. Trouble has been brewing and the hostile attitude of many of the drivers reached a white heat today.

The chairman of the race committee announced that the race was to take place, rain or shine. Later this was modified, and the race was to take place unless it was raining at the hour named for the start.

Sunday night at 8 o'clock, the storm resumed operations after a brief 28-hour furlough, and this morning the city was well soaked. The drivers went out to the course hardly expecting to drive, and made up more like Phoenix road racers than knights of the speedway.

Rickenbacher drove his Maxwell down to the start with his mechanic holding an umbrella over him. Louis Disbrow wore a long yellow raincoat like the little boy in the Skipper sardine advertisement, and the car was equipped with tire chains.

DePalma and C. Newhouse showed up at the pits with their cars equipped with Pennsylvania vacuum cup tires, and Eddie Pullen wanted to know if it was going to be a Vanderbilt cup or a vacuum cup race. Earl Cooper, Gil Anderson, Howard Wilcox and Hughie Hughes made quick changes and put non-skids on the rear wheels.

Course in Wretched Condition

An hour before time to start it was announced that the race would start at noon instead of 10 o'clock, giving the course time to dry out. The asphalt then was a sea of mud, and the boards were covered with a slimy surface that made 40 miles an hour a dangerous pace. While the drivers sat around in heavy coats, and the band played soft music, a small army of workmen lifted the boards in many places on the planked course, and filled in with sand and manure. Entrants and drivers held peevish conferences. Some pilots announced that they would make but one lap of the course to save their entry money, and then pull into the pits.

P. J. Walker, western representative of the A. A. A. and referee of the Vanderbilt, finally announced that the drivers would be lined up, sent around the course once at a slow pace, and then a vote would be taken to decide whether or not the race was to start. This, however, was not necessary. Chairman Kennerdell of the A. A. A. contest board rode around the course in a touring car and pronounced the course exceedingly dangerous, threatening to withdraw the sanction if the race was started. That ended the matter and at the same time, several thousand umbrellas went up to ward off a shower that broke.

The drivers then were instructed to drive around the course once and retire. Why this order was given is not known and many of the drivers made for the first open gate and got away. Barney Oldfield rode away from the course in a touring car, having one of his team mates drive the Maxwell racer out. Barney did not even put on his racing suit, except for a photograph with Governor Johnson and

Mayor Ralph in his car; but stood around in a decidedly noisy overcoat talking with a lot of foreign diplomats.

In many ways, it's a good thing the race was postponed. There had been but one practice on the course, and that was featured by two accidents. Sunday morning the track was open from daylight to 9 o'clock. The planked track was covered with a heavy coat of frost, as slippery as ice, and the first time Eddie O'Donnell in the Duesenberg hit the boards he skidded through the outside fence and landed about 15 feet off the course in a ditch.

O'Donnell suffered painful cuts and bruises about the head and eyes. His mechanic was cut up about the head also. How the boys escaped without serious injury is a miracle. The car was damaged, but by working all night and taking parts off the Duesenberg driven by the late Jack Callaghan, O'Donnell was able to get out on the course for the start with his head in bandages and one eye completely closed.

T. Tomasini in the Tomasini special, met with a mishap in the first and only practice on the course also. After the frost had been melted by the sun a new difficulty confronted the drivers. The mud and slush was forced up through the cracks in the boards as the cars rolled over the planking, and in a short time the clay mud was so slippery that most of the drivers resorted to safety first methods and quit. Tomasini applied his brakes in the center of one of the clay slides and poked his car through the pits on the inside of the course. He worked all night and up to 6 o'clock the morning of the race and was able at great expense to show up at the starting line.

Slow Time in Practice

With the thirty-two drivers unfamiliar with the course, and the dangers existing, it would have been impossible to have averaged 60 miles an hour on the exposition speed trail today. In the practice Sunday the best average made for any one lap was but a fraction better than 60 miles an hour, and then the asphalt was perfectly dry.

CHICAGO'S FIRST ENTRIES RECEIVED

Chicago, Feb. 23—The first entries for Chicago's 500-mile speedway race scheduled for June 19 have been received. They come from the Stutz company, which nominates three cars, the nominations being filed with Contest Director F. E. Edwards, who is at the Vanderbilt meet. Harry Stutz names only two of his pilots, Gil Anderson and Earl Cooper.

Work on the speedway is progressing fast and it is expected that the actual construction of the track itself will start this week, as nearly all of the preliminary construction work has been completed.

Jitneys Make Headway in Big Cities

Philadelphia Investigating New Service

PHILADELPHIA, Feb. 11—The Quaker city's fight for rapid transit now in progress includes the presentation of an ordinance in council authorizing the establishment of a motor bus line, mainly in streets not already traversed by trolley lines. The plan to enfranchise a motor bus line has been the subject of discussion for more than a year, although it was not until late last fall that the first definite action was taken. At that time an ordinance was introduced into council requesting a franchise for the operation of motor buses similar in construction to those operated on Fifth avenue, New York, by the United Traction Improvement Co., recently chartered. The petition, signed by Victor H. Conkle, secretary of the company, represents that the company would start 12 months after the granting of the franchise, and, if possible, would agree to a proposition that would permit interchange of passengers with existing transportation companies.

Another feature of the petition was that the United Traction Improvement Co. would pay to the city one-half of the net profits within 60 days following the expiration of each fiscal year. At the end of 25 years the city could exercise the option of purchasing the franchise and property at par value. The type of buses to be operated were double-deckers, with a seating capacity of 48, weighing approximately 10,500 pounds. Motive power was to be electrically generated by gasoline. The buses, one of which for several weeks following the presentation of the ordinance was on exhibition in the street just inside the city hall, already had received the popular appellation of jitney buses, as the fare stipulated in the franchise was 5 cents. They were to have a speed of 14 miles an hour. The proposition received popular approval at the time, but the ordinance was referred to the highway committee's instant action.

That the real and not an imaginary opportunity exists at the present time for such a company here cannot be denied. Two of the main arteries of travel in Philadelphia—Broad street, north and south, and Diamond street, east and west—are smooth asphalt streets for almost their entire length, and Broad street is one of the longest straight streets in the world, with no transportation for the general public. Lined with beautiful residences and imposing buildings, only the man who owns a motor car can ride from one end to the other. That a motor bus line would prove a paying proposition is a foregone conclusion. The same holds true of Diamond street, which is a direct route from the eastern end of the city into Fairmount park.

Opponents of the measure looked on it as a substitute and an excuse to delay

action on the contemplated subway system. This was characterized by the promoters as ridiculous, as the new line would in no manner be a serious competitor of the subway and in addition would go a long way toward relieving the existing congestion while the subway lines are in course of construction. It will be several years before the subway and elevated lines can be built, and in the meantime, a motor bus line could operate with a profit to both the bus company and the general public. It also was pointed out that a motor bus line would in no sense be other than a short-haul carrier, whereas the subway would reach suburban sections and outlying districts, and opposition in that score had no foundation in fact. Three tentative routes were mapped out, subject to revision as business warranted.

OHIO IS INTERESTED

Columbus, O., Feb. 22—The jitney bus idea is rapidly spreading in the Buckeye state. Steps have been taken in at least four cities of Ohio to operate jitney buses on a more or less organized plan and outside of Columbus the movement has apparently met with considerable success. While it is still considered a fad, to a certain extent, operators of the buses believe that it will become rather profitable, especially when the utility of the scheme is shown to the public.

The first Ohio city to start the buses was Cincinnati, where the Jitney Mobile Bus Line Co. was organized. Several lines were first established and passengers were numerous. Later on the promoters extended their operations to other lines and at present about a dozen routes are being covered.

In Cleveland, the idea became so strong that President John J. Stanley of the Cleveland Railway Co., the traction system of that city, started a counter movement to operate 3-cent buses in competition with the jitneyists. Mr. Stanley claimed that his company was preparing to transfer from the buses to the traction cars and vice versa.

In Columbus, the idea spread like wildfire when Promotor William O'Hara announced the formation of a partnership. Before O'Hara could get his buses in operation a number of individuals started lines, mostly from the center of the downtown section to the east and west corporation lines. A woman, Mrs. Powell, started operations with a Ford touring car. When it was announced that drivers of jitney buses would have to take the state examination for chauffeurs and pay the license fees, Mrs. Powell abandoned her business. Later on the lines were decreased and more of a system in their operation was attempted.

In Toledo the idea was very successful. There is a fight against the traction system in that city because of the expiration of the franchise and many of the people took to the jitney buses in order to register a kick against the traction system. Despite the fact that there is a bond issue question pending for the purchase of the traction system by the city at approximately \$8,000,000, steps are being taken to have the city council authorize another bond issue for the operation of a bus system. In all, more than fifty cars are being operated in that city both by individuals and corporations.

JITNEYS IN CLEVELAND

Cleveland, O., Feb. 22—Jitney buses made their debut in Cleveland Saturday—in Cleveland, the city of 3-cent-cars. Without frills or brass band accompaniment and in the face of pessimistic predictions six jitneys made their appearance on Euclid avenue, Superior avenue and Prospect avenue, running between East Fifty-fifth street and the public square, a distance of 3 miles. The six buses are but the forerunners of many others, according to H. D. Squires, manager of the Central Wagon and Storage Co. and George Dixon, of the Dixon Auto Livery, the pioneering jitney men.

The Dixon buses ran seven-passenger cars on all three streets. H. D. Squires, organizing the Jitney Bus Co., to put on 100 jitneys, operated a nine-passenger car on Euclid avenue. Throughout the day the cars averaged five passengers each trip.

"The jitneys will get the straphanger traffic without a doubt and there is plenty of that," commented J. E. Reynolds, city councilman who is fathering a resolution to have the council order Robert Hoffman, city engineer, to make a survey of the city's whole transportation problem.

NEW SERVICE IN MILWAUKEE

Milwaukee, Wis., Feb. 23—Although the jitney bus made its appearance in Milwaukee several weeks ago, it was not until Monday, February 22, that the latest public transit idea was firmly and definitely established here. The Milwaukee Jitney Bus Co., capitalized at \$100,000, was incorporated on Monday and on Tuesday morning started business with thirty five and seven-passenger cars, running on a strict schedule and over certain routes.

Several enterprising Ford owners of Milwaukee some time ago established their own jitney bus lines. As soon as they discovered that it would cost \$10 for a license to operate a car for hire, most of the owners dropped the plan. Until the organization of the \$100,000 company on Monday, therefore, the jitney bus had not taken a firm hold in Milwaukee.

The new corporation was organized by C. A. Van Ess, who formerly was secretary of the Chicago, Peoria and Quincy

traction line. E. A. Perkins is president and treasurer; Louis Rother, secretary, and Mr. Van Ess general manager of the new line. The offices are at 209 Second street, between Grand avenue and Wells street. Buses will be operated on five crosstown streets, Wells, State, Third, Farwell, National.

For the most part the routes as planned follow closely the streets used by the Milwaukee Electric Railway and Light Co., the Chicago-Milwaukee Electric and Milwaukee Northern road. The present ordinances of the city of Milwaukee permit the operation of jitneys without franchises or other grants, the only requirement being that a \$10 annual license fee be paid for each car used for hire. Naturally the jitneys must comply with all of the laws regulating motor cars and the operation of taxicabs and for hire cars. Drivers are not even required to be licensed to drive jitneys.

TEXAS TO TAX JITNEYS

Austin, Tex., Feb. 20—The municipal authorities of several cities and towns of Texas have under consideration the passage of ordinances regulating the operation of jitney cars. In San Antonio an ordinance has been introduced which imposes an annual tax of \$50 on each car up to seven-passenger cars and \$3.50 for each additional seat above that number. Each car owner also is required to give a \$10,000 bond for each car to protect passengers in case of accident. The cars are required to follow certain prescribed schedules. It is expected the enforcement of this ordinance will cause a big falling off in number of jitneys. The San Antonio Traction Co. has taken off a number of its cars on account of the falling off in traffic, due to the jitneys in operation.

In Austin an ordinance similar to the one which is pending in San Antonio is under consideration. The jitney service has spread to many of the small towns which have a population of 1,000 to 5,000 and where street cars do not operate.

CANNOT DRAW COLOR LINE

St. Louis, Mo., Feb. 22—A St. Louis police court judge decided that owners and drivers of jitney buses in St. Louis could not draw the color line and should haul negroes when the latter sought to be conveyed in the motor cars. The decision was in the case of six negroes who had been arrested when they refused to vacate a jitney car after the driver had declined to carry them. The blacks were dismissed and the motorist warned that the color line could not be drawn, because the motor cars were public conveyances. It is thought the motor people will seek a decision from some higher court before opening their cars to the use of the negroes, whom they say would drive away white patronage.

May Widen Streets for Motor Traffic

Philadelphia Makes Radical Suggestion

PHILADELPHIA, Pa., Feb. 19—A plan to widen half a dozen cross streets 75 feet in the business section of the city for the purpose of providing space for vehicles on cross thoroughfares has been unanimously advocated by the board of trade. This latest plan to relieve traffic congestion will be transmitted to the comprehensive plans committee to further the movement to supply more space for parking vehicles.

While it is admitted by everyone that something will have to be done soon to relieve the choked condition of the streets downtown, due to the ever increasing motor traffic, the present plan has created considerable opposition on the score of extravagance. The assessed value of the structures that would have to be condemned to provide the extra 75 feet mounts up into the millions, hence its opponents attack the proposition by asserting that to ask the city to condemn property along the streets simply for the purpose of permitting public highways to be used as public garages is wrong and that another solution of the problem will have to be sought.

The storage of motor cars in crowded city streets for an hour and even longer, which has become a fixed institution in this city, has been a bone of contention constantly, the law allowing parking in the street for not more than an hour at a time having been honored more in the breach than in the observance. A regulation prohibiting prolonged parking in the streets is being urged, which, if adopted, would mean that a stop only long enough to allow the taking in or discharging of passengers would be permitted.

Opposition to its plan on the score of extravagance and unnecessary expense is met by the board of trade's committee's report on this phase of the situation, which claims:

"The value of all these properties is chiefly that of the land. If they were condemned, say, for a depth of 75 feet, ample space for vehicle storage would be found; fine frontages and sites would be provided for the large buildings such advantages would bring, and the cost would be proportionately small, as but 75 feet frontage on the main streets would be taken and the value of the new frontage would soon be vastly greater than the old."

NEW TRUCKS ON DISPLAY

Grand Rapids, Mich., Feb. 20—Among the thirty-six different makes of passenger cars and eight of commercial vehicles at the local show which closed today was the United Motor Truck Co., a new local concern, which displayed three models, a 1½, a 3 and a 5-ton truck. All have Continental four-cylinder power plants with

the cylinders cast in pairs. On the smaller truck the bore and stroke are 4½ by 5½ and on the two other models 4½ by 5½. All have Stromberg carbureters, Eisemann ignition, multiple-disk clutches, Mayo honeycomb radiators, splash lubrication, Gemmer steering gears, left drive and center control, Timken front and Timken-David Brown floating rear axles.

The worm-driven model, the 1½-ton type, sells at \$2,150. The 3-ton truck with chain-drive is sold at \$2,750 and with worm-drive at \$2,950. The 5-ton model is listed at \$3,400 with chain-drive. The wheelbase of the smaller truck is 148 inches. The other two models have a standard wheelbase of 144 inches, but at an additional cost of \$50 a 120 or a 168-inch chassis is furnished, or a 192 or 216-inch chassis if \$100 is added to the list price.

MICHELIN PRICES REDUCED

Chicago, Feb. 23—Announcement is made by the Michelin Tire Co., Milltown, N. J., of a reduction in the prices of its plain tread tires and tubes, a fair average drop in the casing prices being 13 per cent and for tubes about 30 per cent. The changes affect all sizes and an idea of the reduction may be gained from the following: Q. D. clincher and straight side 30 by 3½ tires now are listed at \$17.75, the old price being \$19.75. The 30 by 3½ tubes now are listed at \$3.25, the previous price being \$4.25. In the 34 by 4 size the Q. D. clincher and straight side tires have been reduced from \$28 to \$24.50 and tubes from \$6.25 to \$4.95. In the 35 by 5 size a reduction of \$4.50 has been made from \$40.50 to \$36. The prices of the steel-studded tires are unchanged.

OVERLAND TOUCHES 300 MARK

Toledo, O., Feb. 22—Monday, February 15, was the biggest day in the history of the Willys-Overland Co. Three hundred cars, valued at \$296,725, were shipped without any accumulation from the preceding day. This is 50 per cent larger than shipments on the corresponding date of last year. The cars went into twenty-six different states and sixty-five cities. Eighteen were shipped abroad to Overland foreign dealers. The entire shipment required ninety-one freight cars. Two hundred and seventy cars have been shipped every day since.

RAJAH PLUG PRICE CORRECTED

In the advertisements of the Rajah Giant spark plug, published in Motor Age January 14 and February 11, the price was given at \$1.25. The makers of this plug desire to correct this, the price being \$1.50, not \$1.25.



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Spade and Pick, Drag and Roller: Their Work

THE historic trails of the pioneers, over which the white-topped prairie schooners once rumbled and in which the laboring mules of the pack trains left the imprint of their hoofs, soon will be choked with engine-throbbing, horn-snarl-ing motor cars as an army of transcontinental tourists celebrate the advent of spring, heed the seductive call of California and start the westward trek to visit the expositions and explore the wonders of the Golden state.

THIRTEEN years ago, such a tour was a dream, a dream in which the most desperate endeavors to make it a glorious reality proved futile. Twelve years ago, it was a journey of hardships and minor misfortunes, a journey over uncharted roads and across wastelands where there was only a trace of an abandoned trail. Today, it is an anticipated migration poignant with pleasures, a migration over improved highways and through regions offering every accommodation for the comfort of motorists. During the spring and summer of 1915, thousands will make the trip to the Pacific coast where in 1903 only four gasoline-buying pilgrims were adventurous enough to attempt the arduous and uncertain ocean-to-ocean journey.

WHY the epochal change in such a comparatively short space of time? Why is the California journey of 1915 a proverbial joy ride compared with the transcontinental tour of 12 years ago when the intrepid motorist flirted with misfortune as soon as he turned the nose of his car westward? What magician has waved his wand and robbed the trek to the Pacific of its terrors?

THERE has been not one magician, but many. The magic wands with which they have worked are prosaic tools—spade and pick, drag and roller. The magicians, plying their magic wands, have transformed the Indian and frontier trails of yesterday into improved roads over which the motor car may travel without accident. Transcontinental highway associations have been organized. Their members have spread the gospel of good roads from the Atlantic to the Pacific. All the states have heard and heeded. The smallest town and the poorest county in the most isolated community have been awakened from their lethargy and their citizens have

labored on the highways and voted funds for the improvement of the thoroughfares within their jurisdiction.

THERE was a promise of a day of reward, a day when the worker with pick and shovel should rejoice that he had labored with his hands for his own good and that of many thousands. That day is about to dawn. By July, its sun will have reached its zenith. As the long line of motor cars roll across the plains, the mountains and deserts, the good roads worker will be convinced that his labor was not given in vain. He will smile with satisfaction as he realizes that he has added much to the pleasures of those who ride in review before him.

THE spread of the good roads campaign has made the California journey of 1915 possible. Were it not for the improved highways across the continent, few indeed would be the motorists who would attempt such a journey. No matter how powerful the motor, how well-balanced the car, the average driver would hesitate before starting a trip in which he would be sure of encountering heavy grades, rough roads and dangerous fords.

EVERY man, who has worked for the cause of good roads, who has dragged his mile or paid his mill for the betterment of the highways, is about to be repaid with compound interest. He may not be paid in dollars and cents. Such debts usually are not. His reward will be even more gratifying. It is the knowledge that he has been one among many who have made the tour to California of the great magnitude that it will be, that he has been instrumental in adding to the joys of his fellowmen, that he has made the seeing of America possible, easy and pleasurable.

THE California migration has just begun. Thousands of motorists will tour to the Golden state this year and after joining in the festival of east and west, leave the blue shores of the Pacific with regret and with a determination to return again. Touring to California will be popular long after the palaces of the expositions have been razed. Thus will the good roads worker reap an annual dividend of satisfaction.

Times Have Changed in the Racing World

POSTPONEMENT of the Vanderbilt cup race has led to complaints on the part of the drivers that the new date comes too close to Venice and that they will have to curtail their practice for the St. Patrick's day event. All of which brings out forcibly that in the future it will be necessary for the contest board of the American Automobile Association to definitely fix a circuit at the beginning of the year and definitely decide just how much practice shall be allowed in order to prevent a conflict of dates. With big meets coming so close to one another as they will this year it would seem as if it will be necessary to cut down the practice

time. While it used to be considered necessary to "live on the course" in the earlier days of racing, now it looks as if the drivers will have to content themselves with a couple of days of training. This should be sufficient in these modern days and by curtailing the practice the A. A. A. will make it possible to accommodate more promoters. With a half-dozen speedways operating, which now seems likely, these meets necessarily must come within a week or so of each other, so it will behoove the drivers to trim their sails accordingly if they desire to battle for the big purses that are offered for this year's work.

New York Solon Asks Assembly to Double Tag Fees

ALBANY, N. Y., Feb. 22—If the provisions of a measure introduced into the New York legislature by Senator Hewitt of Cayuga are enacted into law, the registration fees for passenger vehicles will be doubled and in addition a heavy burden will be placed on the operators of commercial vehicles and passenger buses. Here are the passenger car fees advocated by the Hewitt measure as compared with those at present in force:

| H.P. rating | Proposed | Present | H.P. rating |
|-------------|----------|---------|-------------|
| 25 or less | \$10 | \$ 5 | 25 or less |
| 25 to 40 | 20 | 10 | 25 to 35 |
| 40 to 50 | 30 | 15 | 35 to 50 |
| 50 and over | 50 | 25 | 50 and over |
| Electric | 10 | 5 | |

In addition to this measure which is probably the most drastic of all those at present in the legislative mill, there are some nineteen others, the most important of which are as follows:

Assembly bill No. 19 introduced by Kramer, which provides that provisions now applying to chauffeurs be made applicable to every operator of a motor vehicle; that is, license examination, badge, etc.

Senate bill No. 180 introduced by Simpson, which amends the penal law in relation to injuring or removing road signs or danger signs on the highway and makes the displaying of advertising matter on the highway a misdemeanor, either offense being punishable by a fine of not less than \$5 nor more than \$25 or by imprisonment for not more than 10 days, or by both.

Senate bill No. 332 introduced by Cristman, which would transfer to the state commissioner of highways the power and duties of the secretary of state in relation to motor vehicle.

Assembly bill No. 47 introduced by Flamman, which provides that every operator of a motor vehicle must pass an examination and carry out all the provisions now applicable to chauffeurs and obtain a license at a cost of \$3; no person under 18 years shall be licensed.

Assembly bill No. 575 introduced by Pratt, which also provides for the transfer of the duties of the secretary of state in relation to motor vehicles to the state highway commission.

ATTACK MAINE ROAD LAW

Augusta, Me., Feb. 20—If the bill introduced in the state senate this week becomes a law, the Maine highway commission will be legislated out of office and the whole law of 1913 that meant so much for Maine will be repealed. The petition provides for other methods of handling the funds of the state in the building of roads.

Another bill introduced in the lower branch by Representative Pollard, of Solon, seeks to change the law so that cities and towns would get aid in proportion to their valuation and all having a valuation of more than \$4,000,000 shall receive no aid whatever. The bill plans for aid on the basis that towns with a valuation of \$200,000 or less shall get state aid of \$3 for each \$1 the town appropriates; towns with a valuation between \$1,000,000 and \$1,200,000 get \$1.25 for each \$1; towns valued from \$1,200,000 to \$1,400,000 get \$1.15; those between \$2,000,000 and \$3,000,000 get 75 cents and towns between \$3,000,000 and \$4,000,000 get 50 cents per \$1.

It seems there has been some dissatisfaction among the farmers and the state grange over the building of the trunk highways, and the conditions governing the aid so the legislature has been asked to repeal the laws.

See America First —
See America Now



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EDITOR'S NOTE—This is the fifteenth of a series of illustrations and thumb-nail sketches of the scenic and historic wonders of America to be run in Motor Age with the idea of calling the attention of motorists to the picturesque points of interest in their own country.

No. 15—LAKE ST. MARY AND GOING-TO-THE-SUN MOUNTAIN

Glacier national park, in northern Montana, embracing more than 1,400 square miles of the Rocky mountains, has been called "the Switzerland of America." It has glaciers which rival those of the Swiss, lakes nestling like emeralds on the snow-capped bosoms of the mountains that surpass Lucerne in beauty. The very names of the mountains, lakes and glaciers have a wizardry of Indian tradition about them. In the background of the illustration above is Going-to-the-Sun mountain, which from one angle has a gigantic face of stone, believed by the Blackfeet to be that of Sour Spirit, a mystic creature that came to earth from the lodge of the sun to show the Indians how to hunt buffalo. He was turned to stone when his work was done and his spirit went back to its lodge in the sun. On the promontory is the chalet established for the housing of tourists.

Omaha a Prominent Figure in the Motor Industry

Recent Show Gives Line on Importance of Nebraskan Metropolis as a Distributing Center—Jobbing Business of \$16,000,000 Done Annually

By David Beecroft

OMAHA, Neb., Feb. 20—Omaha distributors and dealers in motor cars and accessories sold \$16,026,750 worth of merchandise through the Omaha territory last year, a good round sum for this city with a population of 200,000, made up by counting in Council Bluffs and such other suburbs as Benson, South Omaha, Florence and Dundee.

Omaha is not seriously considered by many as a motor car distributing center in comparison with Minneapolis, or Kansas City or Dallas, yet figures speak eloquently in proving this to be a center of proud proportions, a city that lies nestled in the heart of the grain belt and a city whose motor jobbing business of slightly over \$16,000,000 per annum compares favorably with Kansas City, whose jobbing trade per annum reaches \$39,000,000.

Spend a few hours with Omaha car dealers and finish up with half a day at the Commercial Club in this city and you will be started on the road to conviction that Omaha is being heard from and will make a louder noise in the future.

Omaha ranks as the third live stock and packing center of the country, being led only by Chicago and Kansas City.

Omaha is the fourth primary grain market in the United States, and is second as a corn market.

Omaha leads all other cities as the greatest dairy city in the country.

Omaha has one of the largest gold and silver smelters in the land.

Nebraska's Grain Report

Last but not least, the annual grain report shows the state of Nebraska stands fifth in total value of crops for 1914. Here are the figures:

| | Crop value |
|--------------------|---------------|
| Iowa | \$351,450,000 |
| Illinois | 319,656,000 |
| Texas | 290,335,000 |
| Kansas | 287,632,000 |
| Nebraska | 210,099,000 |
| Missouri | 192,981,000 |
| Minnesota | 180,432,000 |
| South Dakota | 106,488,000 |

Is there any reason why the proud citizens of Omaha, during last week, when the motor car show held the boards at the Auditorium, should not laud the value of this city in the retail motor car field? For 10 consecutive years the show has been held in the same hall and under the same management. Clarke F. Powell, of the Powell Supply Co., managed the first show and still wears the crown of perennial management. The first show had six exhibitors, but this week there were forty-five, thirty-three showing passenger cars on the main floor and twelve others exhibiting commercial vehicles in the basement. Fifty different makes of passenger cars were shown and sixteen different makes of motor trucks. There were no accessories.

Omaha holds a closed show. You must be a bona-fide dealer, located in this city and with a real salesroom and a legitimate lease on same, before your cars can get on the exhibition floor. This is due to the constitution of the Omaha Automobile Show Association, a \$50,000 corporation, which sells stock at \$50 per share to bona-fide dealers. One share of stock entitles you to exhibit privileges. Forty different dealers are members and all forty were in the show this week. Manager Powell says that not in the 10 years of show history has there been more than one of their members absent. Outside makers were here this week trying to pick up last-minute space, but they found the bars up. No shop, no show, is the cast-iron rule. Here the outsider who would like to launch his cars before the public is not welcome, but let him take up his residence here and he is not only a welcome guest but one of the forty dealers.

Omaha Show Dealers' Display

Like Minneapolis and Kansas City, the Omaha show is largely a dealers' display. There are over 4,000 motor car dealers in the Omaha territory and of these over 2,000 registered at the show this week. A year ago 1,400 attended. Many of these dealers brought two, three or four prospects in with them, not a few of whom signed for 1915 models before the doors closed tonight.

Locally the 200,000 population, Greater Omaha, if you please, is a potential buying power and many retail sales were closed during the week. This is scarcely the season for retail sales, as November, December, January and February are the dead months in the motor business. Deliveries start March 1, a month before Minneapolis, and business continues until the end of October.

Before endeavoring to analyze the Omaha selling field it is necessary to appreciate the territory that Omaha serves, that it distributes to. Omaha territory is all of the state of Nebraska, the three western tiers of counties in Iowa, and with some dealers the lower half of South Dakota. This is a great agricultural territory, one of no mean proportions. It aggregates a total area of approximately 100,000 square miles, all good farming territory. This zone is one-half greater than the entire New England territory. It is twice the area of New York state; you could put a dozen New Jerseys in this area, and it is a little greater than the combined area of Indiana and Illinois.

The potential buying ability of this zone is appreciated when you recall that Ne-

braska stands fifth as a grain-producing state, that Iowa is first, and that one-quarter of Iowa lies in the Omaha distributing zone.

Pause for a moment and analyze the crop situation in Nebraska for the past year, bearing in mind the high prices now prevailing and also the fact that the surplus crop money is largely going to be spent in motor cars and farm implements. Last year the Nebraska wheat crop was 142 per cent normal, or 42 per cent above the average crop for the last 5 years.

The oat crop was 130 per cent of the 5-year average; corn was below normal, being only 82 per cent of the average for the last 5 years; alfalfa was 130 per cent, and hay fell below the 5-year average, being a 90 per cent crop. Here are the figures:

| 1914 NEBRASKA GRAIN CROPS | | | |
|---------------------------|-----------------|-------------|-----|
| | Av. crop 5 yrs. | 1914 crop | % |
| Wheat, bus. | 49,079,400 | 69,732,953 | 142 |
| Alfalfa, bus. | 1,973,820 | 2,689,613 | 136 |
| Oats, bus. | 54,836,200 | 71,413,531 | 130 |
| Corn, bus. | 183,201,200 | 150,235,060 | 82 |
| Hay, tons. | 5,544,749 | 3,015,575 | 90 |

These figures only have meaning when the increase for 1914 is seen. For 1915 prospects are even brighter. The state has been well clothed in snow, the ideal conditions for wheat; the crop acreage is larger than ever before and a banner year for 1915 is already fairly well assured. Prices are sure to be high, even if the war came to an unexpected end.

Outlook for Season

If the farmer were not the big buyer of motor cars it would be useless to quote crop figures such as these, but this is the granary of the world and if you would get your finger on the pulse of industry then get your mind firmly fixed on the crop situation, get the figures into your head. A. A. Murphy, president of the Murphy-O'Brien Automobile Co., distributor of Paige and Dodge cars, will sell two-thirds of its output to farmers; G. L. Dingman, sales manager of Stewart-Toozer Motor Co., selling Chalmers and Pierce cars, sell 10 per cent of their machines in Greater Omaha, and the remaining 90 per cent go to his majesty, the farmer. The farmer sales are well assisted by the fact that there are good strong banks in the small towns in Nebraska as well as western Iowa, so that sales are largely cash, the banks arranging for any accommodations that the farmer may require.

J. R. Jamison, local Overland distributor, has a small territory, twenty-six counties in northern Nebraska and four counties in South Dakota, yet a week ago he had a train load of Overlands arrive, thirty-two freight cars carrying 126 machines. This was the first time such a train load of Overlands had reached this city. Mr.

Jamison got the territory last autumn, yet seventy of these cars were sent direct into the territory and the other fifty-six into storage in this city. Mr. Jamison has already twenty-eight dealers, by May 1 he hopes for forty, and he spends practically all of his time going through the territory.

For the last 10 years the motor car jobbing business has been growing very steadily not only in Nebraska but in western Iowa and the lower part of South Dakota. Figures compiled by the Commercial Club of Omaha covering the last 3 years shed interesting light on this growth. Since 1912 the jobbing in cars and accessories has almost doubled, rising from an annual total of \$9,598,750 in that year to \$16,026,750 the present year. Here are the figures for the 3 years:

| OMAHA'S JOBBING BUSINESS | | | |
|--------------------------|-------------|--------------|--------------|
| | 1912 | 1913 | 1914 |
| Cars | \$7,289,976 | \$10,891,158 | \$12,358,558 |
| Accessories .. | 2,308,774 | 2,284,500 | 3,668,192 |
| Totals ... | \$9,598,750 | \$13,175,658 | \$16,026,750 |

The increase from year to year is regular rather than spasmodic, and the 1914 figures are encouraging in spite of the war, which had its effect for 30 days in August until the citizens found that farming, dairying, and meat packing were to continue, war or no war.

Omaha is a big accessory distributing center, there being approximately eight supply houses that have considerable wholesale and retail business. Manager Powell of the Powell Supply Co., was not only a pioneer in the car selling field in Omaha, but also a pioneer in the exclusive accessory business. Today his supply house trade is 98 per cent wholesale and 2 per cent retail. But the accessory business growth has not been so consistent as

the car business—in fact, 1913 fell a little behind 1912, but the gain in 1914 was most substantial over 1913. The drop in 1913 was largely due to cars, particularly the cheaper makes, being sold with complete equipment, a fact which reduced the accessory field, and makes the showing for 1914 more important.

Omaha is a poor city for electric passenger cars, and as such stands in strong contrast to Kansas City, where the electric is strong. The Omaha citizen cites the hills as being a great reason for few electrics, particularly as the best residential section is all along the hills. Kansas City has its hills, but also it has the electrics. Other reasons have been advanced why the electric has not made greater strides here, one being that this city is not a great manufacturing one in the sense that Toledo, Indianapolis and other eastern cities are, and that there is not the money. Another is that the zone of travel here is greater than in an eastern city of the same population, and the limitations of the electric are apparent. The fact remains that Omaha is not as yet a strong closed-car center, the gasoline coupe not being a big seller, and naturally the closed electrics are wanting.

As a dealers' show Omaha does not rank so high as Minneapolis and Kansas City, but this week has been looked for many weeks by the local distributor and also the out-of-town dealer. The dealer comes to the show. There are over twenty Chalmers dealers in the territory and all were here. The Hup is represented by over sixty, nearly all of whom were present, and during the week not a few new ones signed up. The same is true of Overland, Dodge, and a host of other makes.

000 has been placed by the Russian government with the Morton Truck and Tractor Co., of Harrisburg, it is announced. Samuel Morton, a member of the firm, arrived in London, England, this week and with R. L. Morton, who is also abroad, will represent the Harrisburg company in giving demonstrations and securing contracts for the allied armies.

W. S. Morton, general manager of the company, in speaking of the Russian contract this week, stated that the work will require at least 250 additional skilled mechanics and that with these extra facilities about fifty trucks a month will be shipped to Russia. The work will commence as soon as the amount covering the order is deposited in a New York bank by the Russian government. This is expected within a few days.

The contract calls for 300 tractors at \$5,000 each, of the heavy type recently perfected by the company after much experimenting. The cars are listed at \$9,000, but the large number ordered will reduce the price to \$5,000. The machines are gasoline driven, 120-horsepower and four-wheel-drive. They will be fitted with armor-shields of 5/8-inch steel plate. The patented feature of the Morton tractor is the steering gear, which controls both axles so that the rear wheels follow exactly in the tracks of the front wheels. The tractors will be used to draw gun carriages, ammunition and provision trains for the Russians.

The Morton company has leased a portion of the Harrisburg boiler works, at Nineteenth and Derry streets, to facilitate the work of handling the big order just received.

TRUCK MEN DISCUSS RECORDERS

New York, Feb. 17—"Effects of Self-Recording Instruments in Increasing Deliveries and Decreasing Repairs," was the subject discussed at the regular monthly meeting of the New York section of the Motor Truck Club of America, held to-night in the auditorium of the Automobile Club of America. Three papers were submitted. One written by H. A. Long, general manager of the Service Recorder Co., Cleveland, O., was read by V. E. B. Fuller, local manager of the same company, in the absence of its author. Another, written by Gridley Adams, advertising manager of the Stewart-Warner Speedometer Corp., Chicago, was read by the club secretary, F. Nelson Carle. The third was prepared and read by W. E. McGuirk, sales manager of the American Taximeter Co., New York city. Arthur Mayer of the Speedograph Corp., New York city, cited several instances where companies using the instruments manufactured by the Speedograph company on its trucks had been enabled to denote serious irregularities of operation and save considerable money for the company in military service as a result of the use of the device.

Death Claims H. Ward Leonard

Famous Electrical Engineer Dies of Apoplexy

NEW YORK, Feb. 19—H. Ward Leonard, founder of the electrical manufacturing company bearing his name, and an electrical engineer whose inventions have been of worldwide importance to the motor car and many other industries, died suddenly of apoplexy last night at the Hotel Astor during an entertainment given by the American Institute of Electrical Engineers.

Mr. Leonard was 54 years old and up to the time of his death was active and seemingly in good health. He took a lively interest in the affairs of the Ward Leonard company, acting in the capacity of consulting engineer. His chief activities during the last few years have been concerned with his patent business. More than 100 inventions in actual use are accredited to him covering a broad field represented by electric lighting systems for motor cars, railroad trains, electric distributing systems, electrically-driven reversible rolling mills, electric mine

hoists, locomotives, elevators, gasoline-electric drives, motor car transmission gearing and various automatic control features.

Between the years of 1898 and 1900 Mr. Leonard was a manufacturer of motor cars, having become interested in this industry during a visit to France in 1905. He brought back to this country several foreign motors and incorporated them in cars of his own manufacture. Owing to the difficulties in obtaining material at his Bronxville, N. Y., plant this was abandoned, but Mr. Leonard never has ceased to be keenly interested in the development of the motor industry. The Ward Leonard system of battery charging and regulation in which the basic idea has been to maintain a constant amperage has been of special importance.

RUSSIA ORDERS ARMORED TRUCKS

Harrisburg, Pa., Feb. 20—An order for 300 armored motor trucks costing \$1,500,-

The Readers' Clearing House

INDIANA TOWN HOLDS RECORD? Rays Rochester, Ind., with 4,500 Population Has Fifty-two Makes

ROCHESTER, Ind.—Editor Motor Age—I wish to make a statement against the claim of the St. Petersburg, Fla., reader, whose article appeared in February 11 issue of Motor Age.

In the article referred to it is stated that St. Petersburg, a city of 10,000, contains fifty-two different makes of cars now being manufactured and believes it unmatched in the United States.

Rochester, Ind., a city of 4,500 population can boast of forty-four different makes of cars which are now being manufactured; and, furthermore, mailing lists compiled by mail order supply companies show over 600 car owners are reached through the Rochester postoffice.

This, I believe, puts St. Petersburg's record claim out of the running.—O. R. Carlson.

ELECTRIC AND GAS MOTOR POWER Comparing Trucks Equipped with Different Power Plants

Spokane, Wash.—Editor Motor Age—Why and how does a four-cycle engine backfire in the intake manifold from a lean mixture when the engine is cold and absolutely free from carbon and the spark is retarded?

2—Explain why a 5-ton gasoline truck takes, say a 40-horsepower motor, and an electric truck of the same capacity takes only a 5-horsepower motor.—A Subscriber.

1—A mixture which is too lean may not explode or if it does the explosion will be a poor one in which part of the mixture burns slowly with a flame. The flame sticks to the cylinder wall until the inlet valve opens and then the intruding fresh

charge also is ignited, causing an explosion of the gases in the inlet manifold and mixing chamber.

2—The power of an electric motor is capable of being sustained without motion, in other words, of exerting a constant pressure. A gasoline engine's power is proportional to its speed. The consumption of energy in an electric storage battery is quite independent of its conversion into torque, whereas the consumption of fuel in an internal combustion engine varies almost exactly with the piston travel. A horse, when he encounters an obstacle, is able for a very brief period to exert many times his rated power. One horsepower is the ability to lift 33,000 pounds 1 foot in 1 minute. Take out the minute element and you can rate yourself at 10,000 horsepower, or with sufficient gear you can lift any weight 1 foot, given sufficient time in which to do it. The lower the gear the more time it takes.

An electric motor has an infinite gear ratio. Turning over at 1 r. p. m. it may exert, theoretically, its full power. The same may be said of a steam engine. A gasoline engine, on the other hand, will produce no power at all except within a certain range of speed and its power then is proportional to its speed up to a certain point, as you will find on referring to horsepower curves.

Now, to get back to the electric truck: Having an electrical power plant, the electric truck only has as much power as is needed for average conditions. When it strikes a hill or a mud hole it simply slows down, but pulls just as hard as ever, in

other words, it changes its gear, consuming a greater amount of current per revolution of the wheels under heavy draft than under light draft. A gasoline motor truck, on the other hand, cannot do this. If it slows down it cannot consume as much fuel, therefore, it cannot produce as much power and we put the change-gear into the transmission line which consumes so much power in friction that there are very definite limits to the reduction we may secure in low speed, therefore, in order to be able to get around with the minimum of gear changing we fit the truck with a motor many times more powerful than we need for average conditions.

If the truck has a start and is running along the road the governor shuts it down to a fraction of its full power, it is highly probable that it does not consume more power per ton-mile than the electric, in fact, it may consume less.

SUGGESTS REMEDY FOR MISFIRING Says Carbureter Throttle Needs Attention —Action in a Ford

Davenport, Iowa—Editor Motor Age—In the February 11 issue of Motor Age a reader inquired in regard to his engine misfiring at a certain throttle position and Motor Age advised him to look after his carbureter.

I think his trouble was due to the butterfly valve in his carbureter. I have found this to be the case on a Ford car, although I am not driving one. Most cars have a stop at a certain point to keep the butterfly valve from closing, while some of the Ford cars have no stop; and should the throttle lever come out of adjustment for some reason the result will be that the valve closes too soon; and by pushing it further will open up again.—C. C. Burmeister.

OPERATION OF MAGNETIC DRIVE Used on the Owen Car and Does Away with Clutch and Gearset

Lima, O.—Editor Motor Age—Kindly explain the difference between electric transmission and electric gearshift.

2—Which state in the United States makes the most motor cars?—R. Cameron.

1—The electric gearshift is a device which automatically shifts the change-speed gears by pressure on the clutch pedal. The only electric gearshift made is the Vulcan and it was fully described and illustrated in the December 24 issue of Motor Age on pages 34 and 35.

The electric transmission is used only on the Owen car. The system is known as the Entz and in this a generator and motor are combined in an unusual manner as shown in Fig. 2. The casing of the generator, which carries the fields of whole pieces, is bolted to the crankshaft, re-

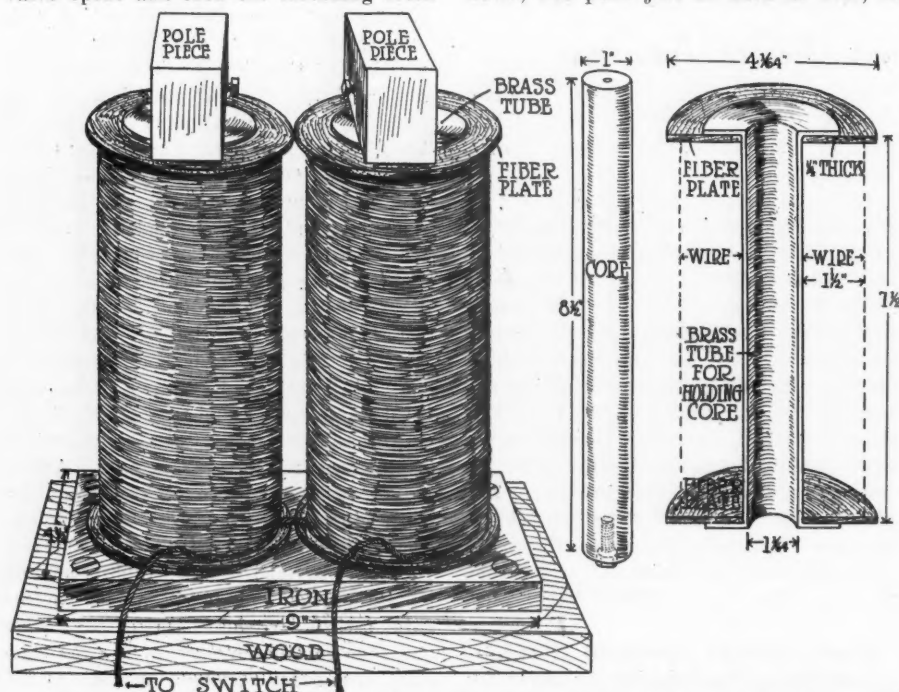


FIG. 1—CONSTRUCTION OF AN ELECTROMAGNET TO OPERATE AT 110 VOLTS

placing the flywheel. The armatures of the two machines are coupled together and their connecting shaft is permanently fastened to the drive shaft.

The speed of the car is regulated by a throttle in the customary manner, but the torque for different loads is varied by changing the field strength of the generator and on lower speeds, by sending the generated current to the motor. When the car is running along under conditions similar to high gear, for a mechanical-driven car, the generator winding is short-circuited on itself and therefore, with a slight amount of slipping the heavy current is generated. This current is of sufficient strength to create a magnetic attraction between the field and the armature equal to the torque required to propel the car at that speed.

The slippage varies with the torque, so that if a slight grade is encountered the difference will become slightly greater, thus increasing the voltage of the generator, which will, in turn, produce a stronger magnetic attraction and the torque will become greater. Seven speeds are provided.

2—Michigan turns out the most motor cars.

HOLDING PRESSURE IN FUEL TANK Suggests Novel Way of Continuing Journey with Filler Cap Lost

Sioux Falls, S. D.—Editor Motor Age—In the January 28 issue of Motor Age you showed how a Packard owner was enabled to maintain pressure in rear tank when tank cap had been stolen. Herewith is described a method with which a driver was able to go on his way.

The driver filled the tank and forgot to replace the cover, there being sufficient gasoline in the carburetor to travel a short distance. A search failed to locate the cover. In cases of this sort take an old inner tube, cut out a piece about 8 or 10 inches long, tie one end tightly so as to be air-tight; then insert the tied end into the tank. Next remove the valve connection from the pump, insert hose in open end of section of tube and pump until tube fills the hole in the tank tightly. Then tie outer end tightly.

This will hold several pounds' pressure in the tank and will last for some time.—Martin Roskay.

Wants to Weigh Some Air

West Bend, Wis.—Editor Motor Age—Can air be weighed on a scale and how can it be done?

Questions Answered and Communications Received

O. R. Carlson..... Rochester, Ind.
A Subscriber..... Spokane, Wash.
C. C. Burmeister..... Davenport, Ia.
R. Cameron..... Lima, O.
Monroe Battery Co..... Cedar Rapids, Ia.
Frank J. Muldone..... West Bend, Wis.
Martin Roskay..... Sioux Falls, S. D.

No communications not signed with the reader's full name and address will be

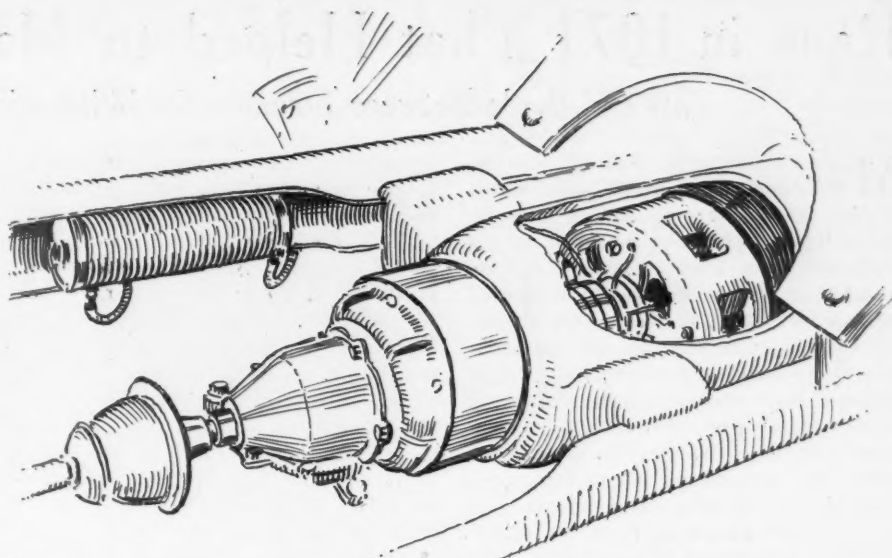


FIG. 2—SHOWING MAGNETIC TRANSMISSION ON THE OWEN CAR

2—If an empty tank was sealer and then filled with 500 pounds of air, would its weight be greater?

3—Give a design of an electromagnet.—Frank J. Muldone.

1—Air can be weighed when it is confined in a closed vessel. A simple method of weighing air is as follows: Take a bottle and create a vacuum within it by exhausting the air with a suction pump. Then weigh the bottle and you will have its weight without the air-content. Then remove the stopper and allow air to rush in, seal it again and reweigh and the difference between the two weights is the weight of the air. Of course the scale necessary will have to be a sensitive one.

2—Yes.

3—Read the answer to the Monroe Battery Co. in this department.

MAKING OF AN ELECTROMAGNET Instrument for Operating at 110 Volts— Wire Size, Etc., Given

Cedar Rapids, Ia.—Editor Motor Age—Which will give the better results, 60 or 74 test gasoline?

2—Can you give me some information concerning the making of a magnet charging electromagnet. The shop is equipped with 50 to 110-volt direct current lines.—Monroe Battery Co.

1—The 60 will show the better results as far as mileage is concerned.

2—Suitable electromagnets may vary in size, design and construction. The following details were carefully calculated so that the resulting electromagnet will give the required field strength to properly recharge magnets. Its construction is as follows:

A brass tube about $\frac{1}{8}$ inch thick at the side and $7\frac{1}{2}$ inches long is made with a $1\frac{1}{2}$ -inch hangover, $\frac{1}{4}$ inch thick as shown in Fig. 1. A hole through the center is a fraction over 1 inch in diameter. Tubes of this sort cannot be bought anywhere; they must be made. If the details are given to a tinsmith he will be able to make one. The cores are of soft iron and are cylindrical and drilled at the bottom as shown. They are to be 1 inch in diameter and $8\frac{1}{2}$ inches long. The rest of the apparatus consists of a semi-hardened steel

base plate $4\frac{1}{2}$ by 9 inches, and two blocks of semi-hardened steel $1\frac{3}{4} \times 2 \times 4$ inches, drilled as shown to receive set screws. Besides this equipment 22 pounds of insulated 20 B. & S. gauge copper wire is necessary.

The first step is to wind 11 pounds of wire around each brass tube, winding one coil one way and the other the opposite way. The best way is to leave about 1 foot of wire over when starting to wind; and with the ends a suitable connection between the coils may be made. After both coils have been wound very tightly lead off the ends. Then shellac the coils and over the shellac wind insulating tape.

Place these coils on the metal base plate in such a way that the distance between the coils will be about $\frac{1}{2}$ inch. Then, with a long center punch, mark a point on the base plate in the center of both coils. Two holes should be drilled into the base plate. The object of the holes is to hold the cores in position. Fit the cores over these holes and slip the coils over the cores. If necessary break the connection between the two coils and connect them later. Now the cores are in position in the coils and the latter are on the base plate. Next attach the top pieces.

These should be drilled in the center and held against the cores by set screws. The entire apparatus is then placed upon the wooden plate. The two ends of the cores are attached to a 110-volt direct current circuit. In recharging, the magnets are placed upon the top pieces.

The length of time to recharge is less than 1 minute. When the magnet, if it be an ordinary magneto magnet, such as used on the majority of four-cylinder or six-cylinder motors, is able to life and hold a weight of 15 pounds, charging is complete. Do not oversaturate the magnet but in charging leave the magnet in position for, say 30 seconds and then remove it for the lift test. If it will not lift about 15 pounds then charge for another 30 seconds, etc.

Race in 1871 That Helped to Make Motor History

"Speed" Battle Between Steamers for Wisconsin's \$10,000 Bonus

MILWAUKEE, Wis., Feb. 20.—An interesting and valuable contribution to the early motor car history is made by J. Henry Optenberg, president of the Optenberg Iron Works, Sheboygan, Wis., in connection with the recently recognized achievement of Dr. J. W. Carhart, builder of what is claimed to be the first self-propelled vehicle in America, who died in Texas a short time ago. Mr. Optenberg was engaged upon the construction of a motor vehicle at the time Dr. Carhart appeared on the streets of Racine, Wis., with his now famous steam buggy.

"From the time the Wisconsin legislature of 1871 offered a bonus of \$10,000 in cash to the inventor of a successful self-propelled vehicle adapted for highway or agricultural purposes, I am thoroughly familiar with the history of progress in this direction," said Mr. Optenberg. "I was one of the mechanics employed in the construction of the engine for the 'Hog,' which won the \$10,000 prize and several years later passed into my possession and was used for a long time to haul a threshing machine in the vicinity of Oshkosh. **State Offers \$10,000 Prize**

"Immediately after the legislature offered the \$10,000 prize, several men interested in machinery at Oshkosh formed a co-partnership to win the award. These men were M. T. Battis, in whose machine shop I was employed; J. F. Morris, owner of the former Bequitt-Davis machine shop; Isaac Gallagher, Frank Shoemar and Anson Farrant.

"The concern employed Mr. Farrant, Mr. Morris, Henry Dohman and myself to build the road wagon. The propelling mechanism consisted of a vertical tube boiler containing 150 1 3/4-inch tubes, with a box-like coil heater rounding at the bottom and horizontally attached to the side of the boiler. A king-bolt casting was attached to the front end and provided with a coil spring, this forming the connection to the steel axle. Two 5 by 8-inch cylinders, link motion, were attached on top of the heater at the front end. The propelling device was a sprocket pinion on the crankshaft, connected by chain to a 30-inch sprocket wheel on the rear axles, which passed across the rear of the boiler. The differential gears were attached to the central portion of the large sprocket wheel.

"The drive chain was of similar construction as that used on the motor truck of today. I have a portion of the chain in my plant as a relic. The steering gear was of a cone taper roller construction, and attached to the front of the boiler at a height even with the front axle. Two chains were attached to the axle, running from a point near the hubs to the gear. The chain was wrapped around the roller

several turns, to allow of winding and unwinding as the axle was turned. The end of the roller shaft was provided with a worm gear, with a worm gear pinion attached to the end of the steering shaft, which led to the rear at the side of the boiler. A wheel was attached to the end of the steering pillar. The construction was not unlike that used today almost universally in motor car practice.

"The engine exhaust pipe was led through the upper part of the boiler, under the cone which covered the top of the tubes, to the stack opening, where it branches into a four-way nozzle for the purpose of creating a good artificial draft.

"The wheels were of wood spoke construction. The tires were of steel, 4-inch in front and 6-inch in rear. The bands were secured to the wheel by bolts through the felloes. The outside end of the bolts were forged into fantastic shapes to serve as calks to prevent slipping and probably suggested the form of the popular non-skid rubber tire tread of the present day.

"At this time similar road wagons were under construction at Green Bay, Racine and other Wisconsin cities. As we completed our vehicle, the state authorities were notified that we were ready to win the prize and the governor appointed three commissioners to supervise and adjudicate the tests. In the spring of 1872 we were ready to compete with the Green Bay wagon, all other entrants having dropped out.

"The Green Bay wagon was of the horizontal firebox boiler type and its mechanism was very complicated. The most striking feature of this construction, however, was the front axle, which embodied the principle of the present day front axle, with its steering knuckles and movable spindles in a yoke.

Conditions of Competition

"The conditions of the competition required that wagons make a trip of 200 miles at an average speed of 5 miles per hour and the commissioners mapped out a route from Green Bay to Madison, the state capital, with a stop at the fair grounds in Oshkosh for speed and tractive power trials on the half-mile horse racing track. We shipped the 'Hog' to Green Bay and started the long journey with the Green Bay wagon.

"Having a constant speed transmission system, we could hardly compete on the road with the Green Bay wagon, which was equipped with a variable speed transmission which looked exceedingly crude because of the great number of exposed rear axle gears. I have no doubt that the present-day gearbox had its origin in this construction.

"Arriving at Oshkosh on schedule, we repaired to the racetrack and underwent

the haulage tests. The tractive effort of each vehicle was about equal and the heavy trailers loaded with water-logged lumber from one of the thirty old mills in operation in Oshkosh at that time buzzed around the track with seeming ease. When it came to the speed tests, however, the 'Hog' was outclassed at the start, but halfway round the Green Bay wagon experienced trouble in the gears and we won out, averaging 8 miles per hour for the 1/2 mile. The Green Bay wagon was repaired in time to start for Madison the next morning.

The Race to Madison

"I never shall forget the race to Madison. We started together, but Green Bay soon was in the lead. Half way to Fond du Lac, however, we overtook the Bay wagon, standing at the roadside and making repairs to its gears. We went right on but 2 miles from Fond du Lac our front wheels ran tight from lack of lubrication. A half hour's work put us on our way, with the Bay wagon out of our sight.

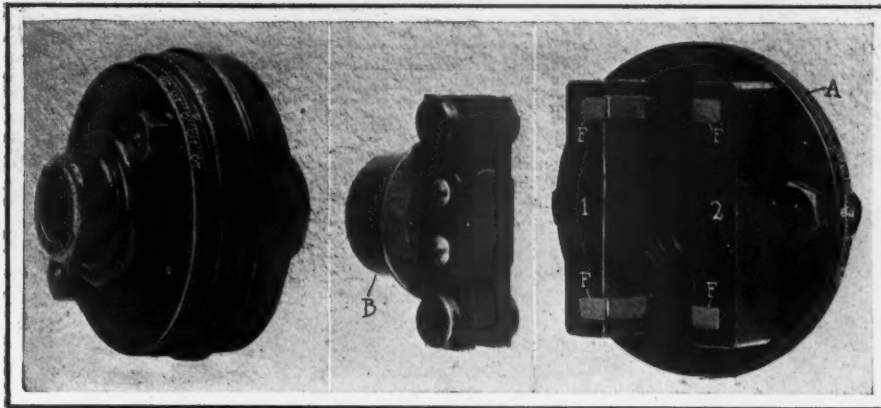
"The commissioners at Fond du Lac instructed us to continue our trip to West Bend or Janesville and lay up until the Bay wagon could be shipped via railroad to either point. This was accordingly done and we started together from West Bend. The Bay wagon's crew decided to use the intermediate gear because of continued trouble when using the fastest speed-gear, and we had no difficulty in overtaking and passing our rival. In fact, we ran away from the Bay.

"Fifteen miles from Madison the commissioners halted us once more and ordered us to stop until further orders. The next day we received orders to proceed to the finish line and we reached Madison that night without a hitch, establishing a record of 6 miles per hour, or 1 mile per hour faster than the minimum speed specified in the conditions of the contest. The Bay wagon did not finish, but was shipped back to Green Bay.

"The commissioners met at the finish line and while deliberating over the award got into a disagreement that could not be untangled. The result was that the whole matter was referred to the next session of the legislature, in 1873. The legislature settled the affair by voting an appropriation of \$5,000 in cash to the owners of the Oshkosh 'Hog' and the amount was accordingly divided among the four men already mentioned. These men continued their tests and soon were able to apply the principle to fire engine practice. I purchased the 'Hog' after we embodied some improvements in the design, and went into the rural districts for several seasons to haul threshing machines from farm to farm."

New Eisemann Magneto Coupling

Device Is Adjustable and Fully Inclosed



NEW EISEMANN MAGNETO COUPLING AND ITS PARTS

THE Eisemann Magneto Co., Bush Terminal, Brooklyn, N. Y., has developed a new type of flexible, adjustable and fully inclosed magneto coupling which has a number of unusual features. It is designed for use with any standard magneto, is easily applied and when in place permits of the removal of the magneto in a simple manner.

The principal purpose of the coupling is to allow of a certain amount of deviation in the driving and driven shafts and to protect the magneto bearings; at the same time, it cushions the driving power.

The device is distinctive for three reasons: 1—It is fully inclosed and therefore dust and dirtproof though the housing is easily removable without the use of tools; 2—It has exceptionally large, flat wearing surfaces; 3—The magneto timing may be adjusted over a range of some 40 degrees—plus 20 or minus 20—without dismounting either the coupling or the magneto.

There are five essential parts to the device, though the cover may be viewed as but one part. These are the driving member A which is attached to the magneto driving shaft in the usual manner; the driven member B which is attached to the magneto armature; and the casing which incloses the whole.

There are no moving parts in the driving member, which consists of two metal plates 1 and 2, which are attached to a face plate. This face plate bolts to a second plate which is keyed to the driving shaft. The bolts which hold the two plates together are fitted into slots, thus providing for a variation in the timing range. By simply loosening the bolts, it is possible to shift one driving member with relation to the other and thus to alter the magneto timing. On the outside of these members there is etched a series of marks which are plainly visible even with the casing in place.

In order to provide for ample wearing surface, large fiber plugs F are inserted in

the plates 1 and 2, as shown. The driven member B consists of a number of laminations of spring steel riveted to the central part. This is inserted so that the round metal buttons bear against the fiber plugs, shown as F.

The springs cushion the drive and whatever slight eccentricity or misalignment of the shafts may exist is allowed for by the sliding of the metal buttons over the fiber plugs. Incidentally, as these plugs are large in area and the contact surfaces are flat, the wearing surface is ample for the purpose.

One of the excellent features of the coupling is that it is possible to remove a magneto without the necessity for taking the coupling apart. The driving and driven members simply are placed vertically and after the bolts holding the magneto have been removed, the instrument may be lifted straight up, the driving member sliding off the driven member. It is not necessary to slide the magneto backward in removing it so that the use of dowel pins in the holding bracket does not interfere with the operation.

The covering which excludes dirt is a light metallic part held in place by a

spring ring which fits into a groove. This casing may be removed, to inspect the coupling or for the removal of the magneto by simply taking off the spring ring and the casing, both of which can be slipped over the drive shaft.

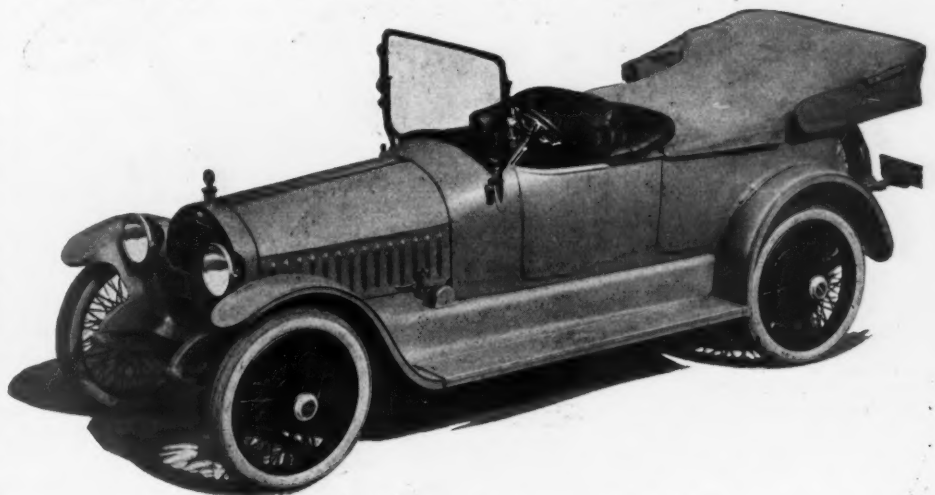
NOVEL TOP COVER ON MARMON

The possession of a five-passenger car not always is a joy, when it is desired to carry only one beside the driver. The open tonneau not only makes the car look unfinished, but is a catch-all for dirt of all kinds. A neat arrangement for closing up the tonneau when only two are to ride, has been hit upon by W. R. Sinclair, an Indianapolis motorist. When his new Marmon 41 was delivered, Sinclair substituted for the regular top boot a special cover of Burbank material, extending from the back of the folded top to the rear of the front seat and buttoning over the rear doors. This completely protects the tonneau.

BADGERS START MOTOR SCHOOL

Milwaukee, Wis., Feb. 20—Starting this month, the motor car course of the Central continuation school has been divided into two classes, known as the short and the long courses. The former class is in charge of Herbert L. Connell, former secretary and treasurer of the Detroit section of the S. A. E., who has recently been added to the engineering faculty, and is intended especially for car owners who wish a general understanding of motor-car construction and maintenance. The long course is being given by R. E. Davis, who has been with the department since last fall, and it goes more into the theory of the subject than does the short course.

A unique feature of the work is that the 175 men enrolled pay no tuition, the school being supported entirely by the city and state. This is a part of the continuation school system of Wisconsin which aims to continue the education of minors working on permits and of apprentices by requiring their attendance a certain number of hours a week on the employer's time.



OWNER EQUIPS MARMON WITH NOVEL TOP BOOT

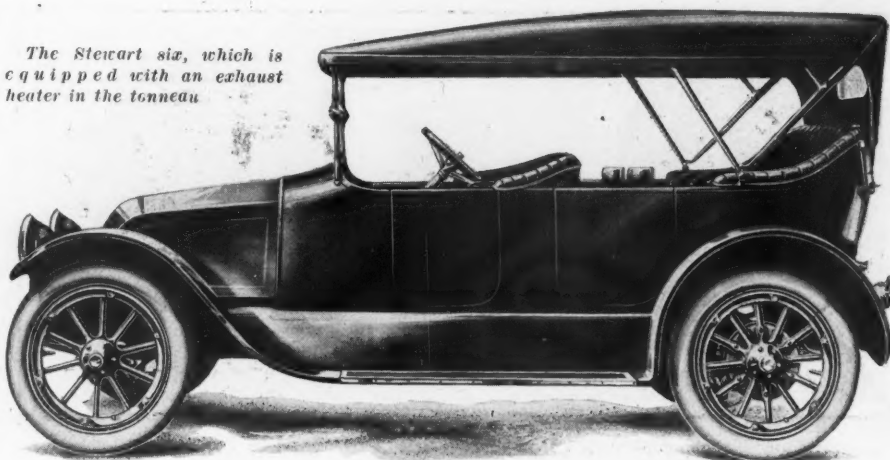
Stewart Motor Corp. Brings Out a Six-Cylinder at \$1,950

Odd Cantilever Suspension—Renault-Type Hood

FOLLOWING the announcement some weeks ago of its intention to bring out a passenger car, the Stewart Motor Corp., Buffalo, N. Y., which, for a number of years has been manufacturing commercial vehicles, has made known the details of its latest addition to the line. The Stewart passenger car is a six-cylinder selling at \$1,950 and the designers have succeeded well in incorporating in the chassis design a number of engineering novelties which, while they are new to the American market, have been tried and adopted abroad. One of the outstanding unusualities, aside from a distinctive foreign-type body with a Renault hood, is the rear spring suspension. This, while it employs semi-elliptic cantilevers, has the springs attached in a most novel manner. The cantilevers are hung on a large tube extending across the frame and projecting through the side members instead of by a bracket riveted to the outside of the frame member.

The body design is unlike most cars now on the market. The hood swings gracefully from the rear to the forward portion of the car, the radiator being placed against the dash, practice which is characteristic of Stewart commercial vehicles. The body itself is made of aluminum, thus reducing the car weight to some extent. An oddity in the way of body equipment is an automatic heating device for the tonneau, which is placed on the heel board of the tonneau seat and uses exhaust gas as the heating agent. Unusual roominess is credited to the Stewart body, which, with its two auxiliary disappearing seats, accommodates seven passengers. If desired the front seat

The Stewart six, which is equipped with an exhaust heater in the tonneau



FEATURES OF THE NEW STEWART SIX

*Seven and three-passenger cars
New cantilever suspension in rear*

Renault-type hood

Continental motor, 3½ by 5

Aluminum body

Heater in the tonneau

Tubular propeller shaft

Westinghouse starting equipment

may be had in bi-furcated form with the aisle between sufficiently wide to allow of easy passage back and forth. At the price mentioned a three-passenger roadster may be had.

The chassis has a wheel-base of 127 inches and mounted in it is a unit power plant consisting of a Continental 3½ by 5 motor

and Brown-Lipe clutch and gearset, the latter affording three speeds. This unit has the feature of being quickly removable from the chassis without disturbing any of the other units, such as starter, steering post or radiator. With the radiator in the cowl the fan is operated from the flywheel by means of a belt. The same cooling principle is used as has been successfully employed on Stewart commercial cars for a number of years.

Lubrication is by circulating-splash, the feed being direct to the three main bearings, through copper tubing, a plunger pump driven by an eccentric from the camshaft being used to force the oil through the system.

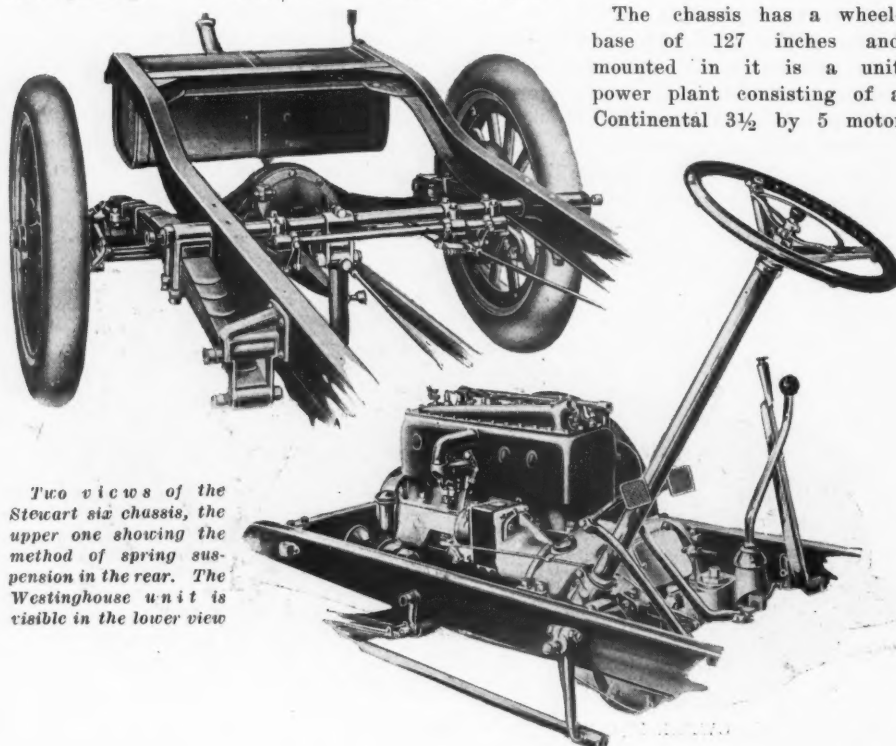
The motor is fitted with a Westinghouse double unit, 6-volt, starting, lighting and ignition system, in which the generator is fitted with an ignition distributor and automatic spark advance mechanism, eliminating a spark-control lever on the steering wheel. Wiring is by the grounded-return system. The carburetor is a Stromberg.

From this power plant a tubular propeller shaft, fitted with Spicer universals, runs to a Timken rear axle using spiral-bevel gears. The front axle also is of Timken make.

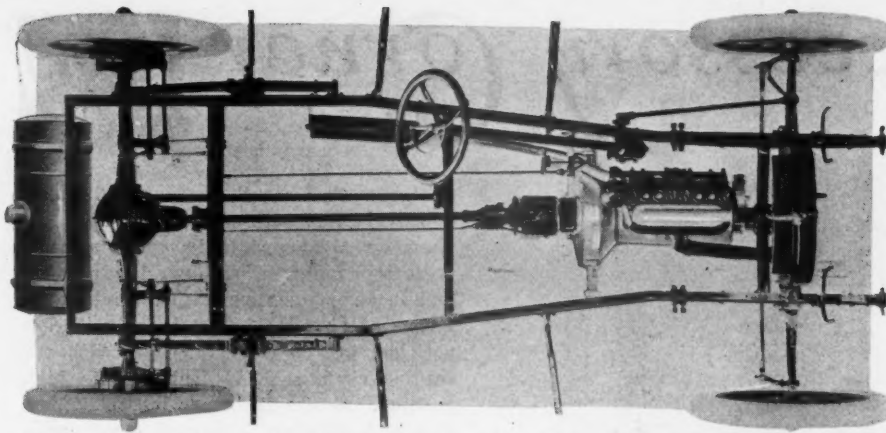
In the equipment is a power-driven tire pump, one-man top with quick-acting curtains, tool kit in a pocket in one of the front doors, and Firestone demountable rims with 34 by 4½ tires.

ENGINEERS DISCUSS EIGHTS

Indianapolis, Ind., Feb. 22—At the February meeting of the Indiana section of the Society of Automobile Engineers held here last Tuesday, there was under discussion the eight-cylinder motor, in which many interesting phases were taken up. The principal speaker was J. H. Heinze, chief engineer of the Northway Motor and Mfg. Co. Charles Crawford, engineer for the Cole Motor Car Co., George Dickson of the National Motor Vehicle Co. and Howard Marmon of Nordyke & Marmon.



Two views of the Stewart six chassis, the upper one showing the method of spring suspension in the rear. The Westinghouse unit is visible in the lower view



Chassis view of the new Herff-Brooks 25, showing the simplicity and neat arrangement of the units

Dorris Producing a New Six-Cylinder Herff-Brooks 25 at \$765 Announced

A NEW six-cylinder, seven-passenger car, selling at \$2,475, has just been brought out by the Dorris Motor Car Co., St. Louis, Mo., the newcomer adhering quite closely to standard Dorris design, using a unit power plant with an overhead-valve motor, disk clutch, etc. It has a 128-inch wheelbase, 34 by 4½ tires and comes regularly equipped with a Westinghouse cranking and lighting system.

The cylinders are cast in threes and are 4 by 5 with valves in the heads operated through long push-rods and overhead gear; all the overhead parts are inclosed by a top housing of extremely neat design. A single camshaft with integral cams is employed. The camshaft not only is unusually large, being 2¼ inches in diameter at the bearings, but it runs in seven bearings.

Lubrication is by constant level splash, the oil being circulated by a gear pump; a sight feed is mounted on the dash and an oil gauge on the crankcase. Cooling of the radiator is furthered by the fan-type flywheel which exhausts the hot air from under the hood and draws in cool air through the radiator. The carburetor is a Stromberg with hot-water jacketed intake pipe.

The three-speed gearset is mounted as a unit with the motor, though there is no housing around the flywheel; the gear shafts run on Timken roller bearings, adjustable for wear. The dry disk clutch is housed in the flywheel, and is sufficiently small to leave ample room for the fan spokes.

Uses Timken Axles

Drive from the gearset to the rear axle is through a propeller shaft with two universals completely inclosed and running in grease. The rear axle is a floating Timken with spiral bevels and a differential that is removable through an opening at the rear of the housing; Timken roller bearings are used throughout the axle, as well as in the front axle, which is of the conventional design.

The rear spring suspension consists of a three-point platform system with 50-inch

side springs and a 40-inch cross spring; front springs are semi-elliptics 42 inches long. The steering gear is a Gemmer worm and gear, adjustable.

Both brakes are on the rear hubs and are 14 inches in diameter by 2½-inch face; the service brake is contracting and the emergency brake expanding. The wheels use 36 by 4½ tires, mounted on Stanweld demountable detachable rims; rear tires are non-skids.

Complete Equipment Furnished

The equipment list is quite comprehensive, including an engine-driven tire pump. Golde one-man top with dust cover and side curtains, rain vision ventilating windshield, 60-mile Stewart speedometer with season odometer and adjustable trip mileage register, tire carriers at the rear, an extra demountable rim, 10-inch electric headlights of the double bulb type, electric tail lights with license carrier, electric inspection light, Klaxet horn, robe rail and foot rest and the usual jack and tool outfit designated as standard.

NEW HERFF-BROOKS 25

The Herff-Brooks 25, announced by the Herff-Brooks Corp., Indianapolis, Ind., and selling at \$765 in five-passenger form, marks the entrance of the concern into the light car field. The 25 is a four-cylinder with a 106-inch wheelbase and is the third car of the Herff-Brooks line. Like the other two cars in the line the 25 is made entirely in the shops of the company at Richmond, Ind. At the price mentioned the new car is fitted with all necessary equipment, including electric starting and lighting accessories. The motor is block-cast, thermosyphon cooled, 3¾ by 4½. It is fed by the Stewart vacuum system, the main tank being at the rear. Atwater Kent ignition is used. The gearset is a three-speed. Rear sus-

pension is by cantilevers and tires on this model are 30 by 3½.

ENGLAND SETS TIRE STANDARDS

London, Feb. 15—In 1913 the tire committee of the Society of Motor Manufacturers and Traders established standards for twenty-three different sizes of pneumatic tire rims. It is announced in the Autocar of February 6, that there is shortly to be a reduction in this number to ten, while eleven different sizes will be standardized for tires themselves. Of this range of tires two of the smallest fit the same rim, but of the rest each has a rim to suit it. The suggested standards are as follows:

| Millimeters. | Inch equivalent. |
|--------------|------------------|
| *700x80 | 27.5x3.14 |
| *700x85 | 27.5x3.34 |
| *710x90 | 27.9x3.54 |
| 760x90 | 29.9x3.54 |
| 810x90 | 31.9x3.54 |
| 815x105 | 32.1x4.13 |
| 820x120 | 32.3x4.72 |
| 880x120 | 34.6x4.72 |
| 895x135 | 35.2x5.31 |
| 935x135 | 36.8x5.31 |
| 915x175 | 36.0x6.88 |

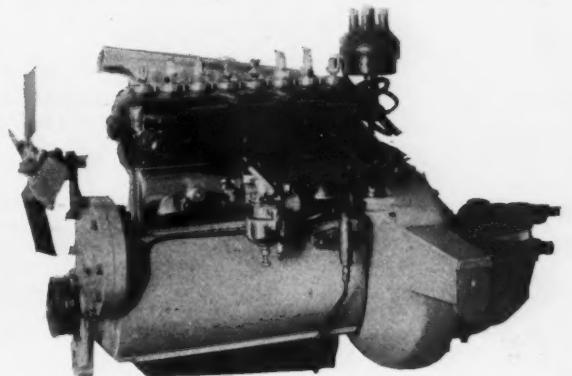
* These two tires fit same rim.

The Autocar points out that these standards neglect the demand for tires of larger diameter for use in the rougher of the British colonies and states that the idea is to leave the larger sizes unstandardized for the present.

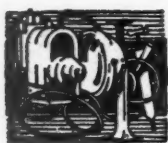
It is, of course, to be regretted that there is the fundamental difference between the British standards which will take effect throughout Europe and those in use in America, and it seems unlikely that American-made tires will fit the new standard rims unless made specially to conform to the S. M. M. and T. specifications. It might also be pointed out that it will at once become a drawback to an American car in Europe if it has rims to take standard tires.

INDUSTRY USING MANY FREIGHT CARS

New York, Feb. 22—At the last meeting of the directors of the National Automobile Chamber of Commerce it was reported that the shipment of motor cars from factories of this country in the year 1914 reached the tremendous volume of 138,250 carloads, each freight car usually containing from two to six complete motor cars and in some cases more when the machines were taken apart.



Four-cylinder motor used in the Herff-Brooks 25. It is 3¾ by 4½ and uses Atwater Kent ignition



The Accessory Corner



New Mott Wire Wheels.

THE Mott Wheel Co., Utica, N. Y., now is offering something new in wire wheels for Ford cars, the latest being this type with demountable rims and selling at \$35 per set of four wheels and an extra rim. The wheels are furnished complete with ball cups, balls, dust protectors and caps, and a wrench for the spindle nuts. The rims are 30 by 3½, held in place by five wedges and nuts. The hub caps are nickel plated and the weight for four wheels is approximately 120 pounds with the rims. The Mott is shown in Fig. 1.

Columbian Fuel Storage System

A medium price gasoline storage system for both public and private garage use is

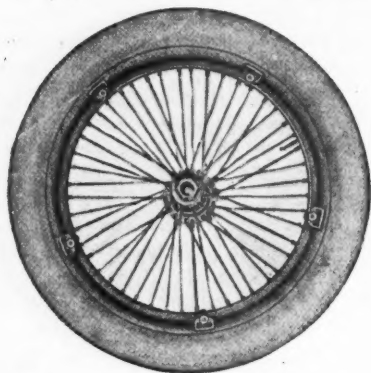


Fig. 1—A new Mott wire wheel for Ford cars. This wheel has a demountable rim held in place by five wedges and nuts

manufactured by the Columbian Steel Tank Co., Kansas City, Mo. This outfit, shown in Fig. 3, is known as the No. 16 and the pump is self-measuring in pints, quarts, half-gallons and gallons. Tanks supplied are of standard sizes ranging from 65 gallons capacity to 1,100 gallons. These tanks are made of rust-proof iron

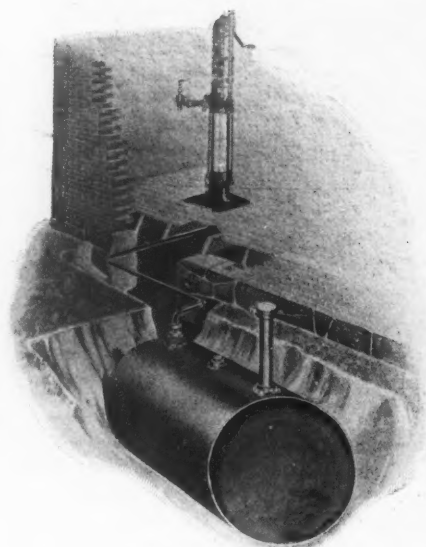


Fig. 3—Columbian gasoline storage system, which is made for public and private garage use

either riveted and soldered or welded, as desired. The pump has a gray iron frame and brass is used for the cylinder, plunger rod, stuffing box and gland.

Vacuum Carburetor System

A system of fuel feed which transforms a pressure into a gravity feed and which is known as the Vacuum carburetor has just been announced by the Vacuum Carburetor Co., Detroit, Mich. This attachment, in the form of a four-compartment vessel, can be attached to the carburetor, taking the place of the float mechanism, or it may itself be used as a feeding device instead of an ordinary carburetor. It is shown in Fig. 9 in section and in Fig. 7 externally.

The vacuum carburetor consists of four

chambers, A, B, C, D, cast integral and in communication with each other. The float chamber A always is in communication with the fuel-tank through the pipe Y, and in communication with air intake by means of pipe F, if float G is in its low position, but in communication with the feeding chamber B if float G is in high position. B also is always in communication with chamber A through check valve J, and likewise in communication with the atmospheric or constant level chamber C, which is in communication with the atmosphere through opening L and through nozzle R with the intake D.

When the engine is turned over, a vacuum is formed in D and F, and inasmuch as valve M is open, and valve N closed also in chamber A, hence fuel is drawn from the tank through Y to chamber A, raising the float which closes M opening N. At once the vacuum in A will be transferred to chamber B and fuel will raise in B until the level in B and A is equal, the two chambers A and B repre-

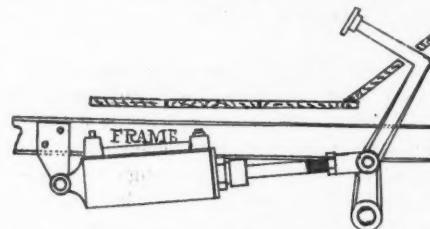


Fig. 4—Showing method of attaching the Schooler hydraulic clutch check, which prevents harsh gear changes and clutch grabbing

sending communicating vessels under vacuum condition. At the same time the suction on nozzle K will draw fuel from chamber C and air will pass up vessel B and will be displaced by the like amount of fluid flowing from B into chamber C. Chamber C always will be maintained by vacuum. In feeding vessel C, the float sinks, and the cycle is repeated.

Savidge Ford Steering Attachment

In order to prevent front-wheel wobbling, eliminate shock to the steering mechanism and make Ford car driving easier and safer, the Savidge Steering Device Co., 32 Georgia St., Indianapolis, Ind., has brought out a steering attachment shown in Fig. 6 attached and in Fig. 8 unattached. By means of a heavy spring this device tends to keep the front

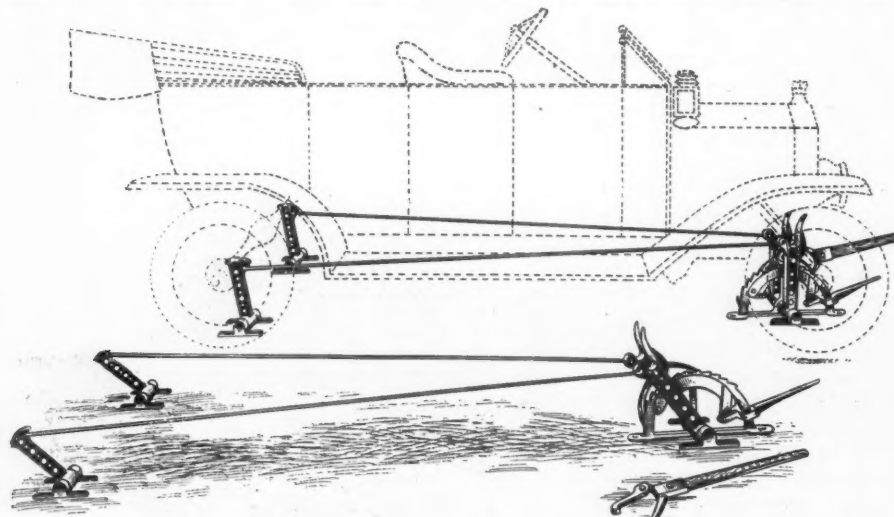


Fig. 2—Little Wonder motor car jack, which raises the entire car from the ground. The car is driven over the jack and the lever pulled when the four wheels are made to clear the floor



Fig. 5—Schooler clutch check, which is a hydraulic device automatically operated by the clutch pedal as shown in Fig. 4 and which prevents the clutch taking hold harshly

wheels in a fixed position and at the same time does not interfere with easy movement of the steering wheel.

In the Savidge, a pair of arms are pivotally connected to two yokes, one on the center of the axle and one on the tie rod. The axle yoke contains a cam on which a steel roller or cam acts against the compression of a spring. The cam action is variable and so designed as to give a greater degree of spring compression when acting near center position than when acting on the short turn positions. The total spring compression is only 5/16 inch, and therefore a large heavy spring is used.

The Savidge weighs about 4 pounds and is adjustable. It is attached easily with six bolts.

Schooler Hydraulic Clutch Check

A clutch accessory which is said to cause easy engagement under all conditions is announced by the O. E. Schooler Co., Webb City, Mo. The Schooler is an hydraulic device attached to the clutch control linkage as shown in Fig. 4. When the clutch pedal is depressed it is allowed to return to engaged position without a jerk and so makes up for the inexperience of the driver. It is said that even should the foot slip off the clutch pedal when the latter is pressed down, there will be no

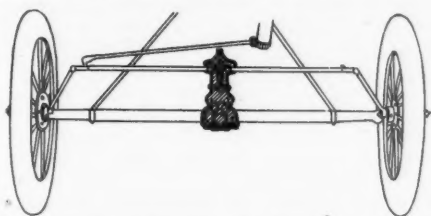


Fig. 6—Showing how the Savidge Ford steering attachment is applied to the car. The device itself is shown in Fig. 8

grabbing or noisy gear changes. It is attached easily and weighs 4½ pounds. Price is \$10.

Little Wonder Jack

A tire saving and lifting jack made especially for Ford cars, is being marketed by the Little Wonder Auto Jack Co., Kansas City, Mo. This jack lifts all four wheels at once and requires only the pressing of a lever for the operation. There are three points of support when the car is raised as shown in Fig. 2. The two at the rear are close to the wheels and the one at the front is in the center of the front axle. In operation the car is driven over the jack until the front end is clear of the floor. The long lever of the jack then is pressed down and the whole car is raised. To lower the car, the small trip lever is pressed with the foot. Price is \$6.95.

R & L Signal

The R. & L. Signal Instrument Co., Beloit, Wis., is manufacturing a unique signaling device for motorists. The device consists of illuminated disks attached to the front and rear of the car and containing two letters, "R" and "L," meaning

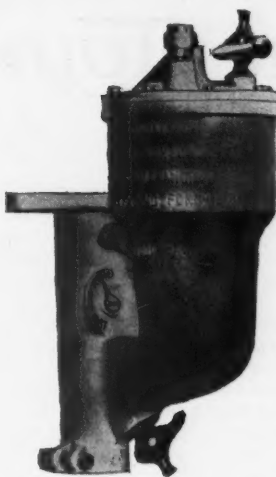


Fig. 7—Exterior of the Vacuum carburetor, which changes a pressure to a gravity system. It also may be used in connection with the present carburetor

right and left. A push button on the steering wheel operates the signal light and the driver is thereby able to indicate to vehicle and pedestrian traffic the direction in which he is about to turn.

Repairs Scored Cylinders

W. B. Cobb, 2935 Detroit avenue, Cleveland, O., has brought out a machine which repairs scored cylinders in an unusual way. The machine mills out the scored or worn place just deep and wide enough to leave a dovetailed groove with very smooth angle. These grooves are filled by planing up a strip of fine gray cast iron just the right size so it can be pressed into the grooves and thick enough so it will a little more than fill the groove. Then this is machined off to the true circumference of the cylinder so the same piston and rings can be used.

X Radiator Leak Repairer

A liquid leak repairer for radiators and cracked water jackets is being marketed by the X Laboratories, 630 Washington street, Boston, Mass. This liquid, called X, is introduced into the radiator while the latter is filled with water. It is stated the liquid makes its way to the crack and the portion reaching the air immediately solidifies, in the hole, thus plugging it. This compound is sold in pint cans at \$1



Fig. 8—The left illustration shows the Savidge steering device for Ford cars and the lower the Climax jack

each, which is sufficient to make two large repairs. It also may be used effectively in repairing a cracked water jacket. The presence of anti-freeze solution does not retard the action.

Inland Piston Rings

The Inland Machine Works, St. Louis, Mo., has added to its line the Inland piston ring, which is a type designed to prevent the leakage of mixture and oil past the piston. The peculiarity of this ring is that it is made in one piece and appears like a two or three-part ring. The ring is concentric and the ends which overlap one another for half the circumference. The

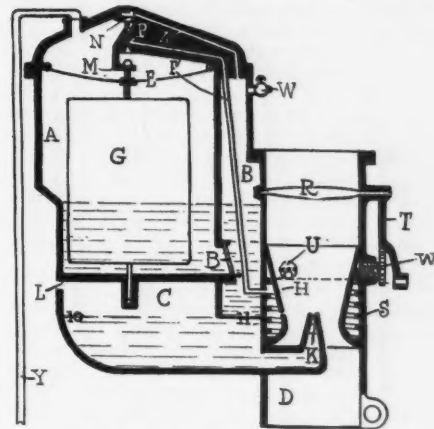


Fig. 9—Sectional view of the Vacuum carburetor, showing the four compartments A, B, C and D

overlapped portions allow for springiness. Price is \$1 for the 2½ to 3½ size.

Climax Tire Saving Jack

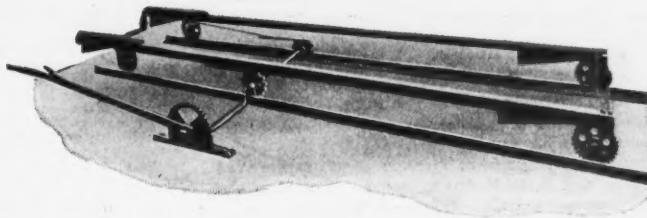
A garage jack which relieves all four tires of their load is being manufactured by the Climax Auto Jack Co., Kansas City, Mo. This jack, shown in Fig. 8, lifts the entire car after the lever shown in the Illustration is pulled.

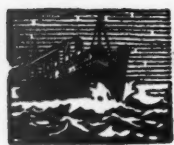
Pondelick Piston Ring

A two-part piston ring of the anti-leak type is announced by the Chicago Auto Equipment Co., 319 South Jefferson street, Chicago. One portion of this ring is similar to the ordinary type and it fits over another part which has a shoulder.

Error in Carburetor Story

In the January 21 issue of Motor Age in the carburetor story it was stated that the Newcomb line made by the Holtzer-Cabot Electric Co., Brookline, Mass., is featured with a line of waterjacketed carburetors and that all previous models were built without waterjackets except the ¾-inch size. This is incorrect, as this concern has been marketing waterjacketed instruments in all sizes except the ¾-inch.





From the Four Winds



New York Dealers Elect—The directors of the Automobile Dealers Association of New York City have re-elected R. H. Johnson president and Charles H. Larson vice-president. Charles M. Brown was elected secretary and treasurer of the organization in place of Frank Eveland.

Ohio Saving Road Funds—The finance committee of the Ohio house of representatives has made a cut of \$59,460 in the appropriation for the maintenance of the Ohio highway department. This reduction was effected by abolishing positions, consolidating others and generally re-organizing the department.

Making it Easy for Owners—A bill has been passed by the Ohio senate to permit of the transfer of number plates from one car to another by the same owner, upon the payment of a fee of 50 cents for the transfer. Heretofore when a man purchased a new car he was compelled to take out a new registration entirely.

Teaching Road Building—The University of Michigan's first short course in highway engineering has been opened with prospects of an average attendance of at least 100 for the semester. The course is for the purpose of aiding in supplying information to commissioners and highway engineers relating to the construction and maintenance of country roads.

Ohio Orders Lights—A law has been passed by the Ohio general assembly compelling all vehicles, both motor-driven and horse-drawn to carry lights, visible from in front and behind when operated on all of the public highways and streets of the state after sundown. This is the law which has been desired by the Ohio State Automobile Association and local clubs for some time.

Texas Orders Registration—The state attorney general's department of Texas has rendered an opinion that all owners of cars are required to register them with the county clerks of the respective counties and to place upon the car so registered a number corresponding with the registration number, for which a registration fee of 50 cents per car must be paid. The fee so paid is merely for registration and is neither a license nor a tax and it is required to be paid at once.

New Club in Ohio—At a meeting of motorists of Logan county, O., held at Bellefontaine, Ohio, recently the Bellefontaine Automobile Club was re-organized into the Logan County Automobile Club, to include motorists from all parts of the county. An entirely new list of officers was elected as follows: C. B. Halboth, president; Herbert Miller, vice-president; J. W. Thatcher, secretary and M. E. LeSourd, treasurer. The board of governors consists of H. E. Knight, D. W. Askren, Cliff Hafley, H. N. Thomas and Frank Hutchins. A. Jay Miller was named consulting engineer.

Plan New York Contests—At the third annual meeting of the Motor Dealers' Contest Association of New York, William C. Poertner was re-elected president of the organization. The other officers to serve for 1915 are as follows: E. Lascaris, first vice-president; E. C. J. McShane, second vice-president; J. C. Nichols, treasurer and Edward F. Korbel, secretary. The new board of directors consists of all of the above officers and the following: C. H. Larson, I. M. Upperpu, W. J. Morgan, Horace De Lissar, A. B. Cordner, S. S. Toback, George H. Robertson, James Carples, Charles Wells and Da-

vid Beecroft. The Motor Dealers' Contest Association has held several successful race meets at Brighton Beach and a number of tours and its activities for 1915 will be greatly increased judging from present plans.

Would Prevent Back-Firing—State Senator Paul, of Kent county, has introduced a bill into the Michigan legislature to compel car manufacturers to provide all motor cars with a safety device to prevent internal-combustion engines from back-firing and thus cause people to be hurt while cranking their motors.

Must Change His Sign—Objecting to the use of the name "Ford," the Ford company has compelled M. Reardon, garage proprietor of Peoria, Ill., to change the name of his plant from "Ford Repair Shop," to "Repair Shop for Ford Cars." It is said that similar action will be taken at other points where the same objection applies.

Hartford's New Law—Henceforth it will be a misdemeanor for a motorist in the city of Hartford to pass a standing trolley car. The car driver must bring his machine to a dead stop while a trolley car is receiving or discharging passengers and he may not pass around the left side of the trolley in order to get ahead of it which has been a practice in the past.

Wilmington Association Formed—The motor car dealers of Wilmington, Del., have formed a permanent association for mutual consultation, etc., by electing the following officers: J. H. Nixon, president; Enoch Moore, Jr., vice-president, Harry A. Partington, secretary and treasurer; J. H. Nixon, Enoch Moore, Jr., H. A. Partington, J. Frank White and R. R. Banks, director for one year.

To Change Fee Collectors—A bill taking the collection of the state motor tax out of the hands of the secretary of state and placing it in the hands of the county auditors has been passed by the house of the Indiana legislature and it is believed it will become a law. The purpose is to reduce the cost of collection. The state is to sell the license tags to the counties at cost. The county auditors are to be permitted to charge a notary fee of 25 cents for issuing

licenses in each instance. All beyond the cost of the tags is to be retained by the counties for good roads work. It now costs the state \$40,000 annually to collect the license fees and all above this cost goes to the counties for good roads.

Peoria Dealers Organize—The Automobile and Accessory Dealers Association of Peoria, Ill., has been organized. The board of directors includes H. B. Pinkerton, C. E. Lyall, R. F. Graham, H. B. Russ, H. L. Tauzer, George Cummings, E. J. Selard, J. H. Woody, and F. C. Vaughan. The directorate will elect officers later.

New Ohio Bills—The Ohio senate has passed a bill, classifying chauffeurs into two classes, making a stiffer examination for one class as compared to that given the other class. The minimum age limit for operating cars is fixed at 16 years. No maximum age limit is provided although an attempt was made to have it 60 years. Representative Deaton has introduced a bill in the Ohio legislature providing for the suspension of the owner's license for 60 days upon being convicted of violating the speed limit; a suspension of a year for the second offense and permanent suspension for any subsequent offense. The new measure makes no difference between a chauffeur and an owner. This bill will be opposed by the Ohio State Automobile Association and the various local clubs in the state.

Michigan Getting Strict—If a bill introduced in the house of representatives of Michigan by Representative Miller of Montcalm county becomes a law it will be unlawful for a motor car driver to run a machine after he has taken one drink, as proof that the driver has taken one drink will be prima facie evidence that he is drunk. Representative Miller believes that if his bill is enacted into a law it will prevent nine-tenths of the accidents involving motor vehicles in Michigan. The bill is aimed to prevent the driving of cars by intoxicated persons and contains a special provision to the effect that if a man is proved to have taken a drink just before driving or while driving it shall be evidence that he is drunk. The measure provides a fine of \$250 or 90 days, or both, in the discretion of the judge.

Detroit, Mich.—Associated Lozier Purchasers of Wayne Co.; capital stock \$20,000; incorporators, Theodore Friedman, Murray Rothschild and Harry Frank.

Detroit, Mich.—The Kosmath Co., to manufacture trucks and delivery cars; capital stock, \$50,000; incorporators, Edward T. Birdsall, Guy L. Sintz, Frank C. Sibley.

Detroit, Mich.—Dadco Auto Service Co., to deal in motor cars; capital stock, \$1,500; incorporators, Alfred C. Waters, W. C. Farrington, Charles E. Kriebel, William F. Cornell.

Grand Rapids, Mich.—The Prentiss-Weaver Mfg. Co., to manufacture parts and accessories; capital stock, \$20,000; incorporators, D. B. Philio, T. A. Taylor and G. O. Babcock.

New York—The A-L-M Motor Sales Co., Inc., capital stock \$1,000; incorporators, Joseph M. Baum, C. M. Rosenthal, Max Horowitz.

New York—Brighton Heights Garage, Inc., to operate garage; capital stock, \$2,000; incorporators, C. A. Furlong, Annie Furlong, H. J. Furlong.

New York—Tremont Tire & Supply Co., Inc., capital stock \$2,000; incorporators, N. J. Finner, E. A. Finner, M. B. Coleman.

Racine, Wis.—The Electrical Shop, to manufacture, repair and deal in electrical devices, appliances, etc.; capital stock, \$5,000; incorporators, William Pratt, Kerner Brandels and Fulton Thompson.

Rome, N. Y.—Bryant-Noonan Auto and Cycle Co., capital stock \$5,000; incorporators, A. S. Noonan, George W. Bryant, A. J. O'Connor.

Springfield, Mass.—Philbrook's Motor Car Co., capital stock \$5,000.

Brooklyn, N. Y.—Williams Taxicab Co., Inc., capital stock \$1,200; incorporators, George D. Williams, John F. Disken and Felix Bragaglia.

Recent Incorporations

Albany, N. Y.—Consauls Tire Co., Inc., capital stock, \$15,000; to manufacture tires and motor accessories; incorporators, V. E. Consauls, M. A. Consauls, Edwin W. Sanford.

Beloit, Wis.—The R. & L. Instrument Co., to manufacture signal devices for motor cars and trucks; capital stock, \$25,000; incorporators, J. E. Keeley, L. S. Carr, H. D. Ball and J. I. Floyd.

Buffalo, N. Y.—Williamsville Sales Co., Inc., capital stock, \$10,000; incorporators, Arthur Warns, Jr., H. M. Abel, H. N. Kraft.

Canton, O.—The Reo Motor Sales Co., to deal in motor cars; capital stock, \$10,000; incorporators, John Jacob, J. Edgar Harris, F. X. Volzer, P. Campbell, William Jacob, Olivia Daum.

Detroit, Mich.—Wolverine Garage Co., to engage in general garage business; capital stock, \$1,200; incorporators, Charles C. Harbridge, Albert T. Hamlin and James R. Gilbert.

Detroit, Mich.—S. R. K. Motor Co., to build motor cars; capital stock, \$100,000; incorporators, Thomas D. Knight, Frederick H. Ranney, and Clarence B. Strouse.



Among the Makers and Dealers



WIDAM Looking for Plant—The Widam Mfg. Co. of New York is seeking a location for a plant at Springfield, Ohio. James C. Widam is president.

Savage Plant Busy—The Savage Tire Co. of California has increased the working force in the Los Angeles plant and also is working the full 24 hours a day, using three shifts for this purpose.

New Tire Company—A charter has been filed by the Missosan Tire Corp. of Dover, Del., capitalized at \$3,000,000, to manufacture tires. The incorporators are S. S. Howard and H. O. Coughlin, both of New York.

Dort's Sale of Stock—The Dort Motor Car Co. of Flint, Mich., which is incorporated for \$500,000, reports that more than \$200,000 of this already has been paid in. A previous statement in Motor Age placed this sum at \$27,000.

Biggers With Hyatt—W. E. Biggers, formerly associated with the Packard and the Ford, has joined the Hyatt Roller Bearing Co. in capacity of advertising manager. Mr. Biggers will have his headquarters at the Detroit office of the Hyatt company although he will spend much of his time traveling.

Credit Association Election—The board of directors of the Automobile Trade Credit Association, 80 Wall street, New York city, has re-organized for the ensuing year. Carl Kaufman, of the U. S. Horn Mfg. Co., was re-elected president, and Franz Neilson, counselor at law, at 80 Wall street, continues as counsel and secretary-treasurer.

Pennsylvania Tire Election—At the annual meeting of the directors and stockholders of the Pennsylvania Rubber Co., the following officers were elected: Herbert DuPuy, chairman of the board; H. W. DuPuy, president-treasurer; C. M. DuPuy, vice-president; S. G. Lewis, general manager, G. W. Shiveley, secretary; and C. G. Morrill, assistant treasurer.

Billings & Spencer Expanding—Extensive alterations are now in progress at the plant formerly occupied by the Columbia Motor Car Co. at Hartford, Conn., and recently purchased by the Billings & Spencer Co. The forge shop has been entirely remodeled, in fact the whole plant has been subjected to a complete change. The Billings & Spencer company is said to be rushed just now with large orders for drop hammers.

Marx Horner Company President—At the annual meeting of the stockholders of the Detroit-Wyandotte Motor Co., manufacturer of the Horner trucks, Frank Marx, was elected president; Herman Woelmer, treasurer; W. J. Seitz, secretary and George A. Horner, general manager. The business during the past year was declared to have been very satisfactory and it was decided to increase the production this year.

To Cater to Orphan Cars—The Service Gear and Machine Co. of Reading, Pa., has purchased the entire stock of gears and shafts, patterns and eccentric of the service department of the American Die and Tool Co., transmission and rear axle manufacturer of the same city. The Service Gear and Machine Co. will endeavor to maintain a permanent stock of the transmission gears, spline shafts, countershafts, bevel differential gears and axle shafts for the majority of the obsolete or orphan cars throughout the country. Stock will be carried at Reading, Pa., and appointed dealers throughout the country. The new company intends to specialize on the parts above mentioned.

The Service Gear and Machine Co. will have no connection with the American Die and Tool Co. whatever, being a distinct organization entirely.

Electric Storage Battery Co. Dividend—Directors of the Electric Storage Battery Co., have declared a dividend of 1 per cent from the net earnings of the company on both common and preferred stocks, payable April 1, 1915, to stockholders of record at the close of business on March 22, 1915.

To Accept Cash Settlement—At the first meeting of creditors of the bankrupt Detroit Foundry and Mfg. Co., they decided to accept a cash settlement of \$4,000 for their claims which will result in the distribution of a dividend of about 15 percent. A first dividend of 5 percent was ordered paid at once by Referee in Bankruptcy Lee E. Joslyn.

Dort Men Meet—Presided over by General Sales Manager John D. Mansfield, of the Dort Motor Car Co., about twenty-five district sales manager and big dealers of that new company held their first convention this week. Among the various subjects which were discussed was the condition of the motor car business in the United States, the outlook in the various states, dealers selling campaigns, establish of service stations.

New Wisconsin Concern—The United States Wheel and Tire Co. of Rockton, south of Beloit, Wis., has perfected its organization by the election of these officers: President, E. S. Gleasman; vice-president, G. W. Shaw; secretary, N. M. Wilcox; treasurer, J. Roy Atwood. The company has been given a donation of a 4-acre factory site in Rockton and is preparing for the erection of a brick and concrete factory, 100 by 100 feet in size, equipped for the manufacture of an elastic or flexible wheel for motor cars and trucks. The resiliency is obtained by means of a series of flat elliptical springs so arranged that the tire proper is

able to withstand an even greater side stress than the spokes of the wheel themselves. Frank Denny has been appointed sales manager.

Bishop in the King Row—R. P. Bishop has been appointed assistant sales manager of the King Motor Car Co. He was formerly sales manager of the Cutting Motor Car Co.

McGlehan Quits Motz—T. H. McGlehan, vice-president and general manager of the Motz Tire and Rubber Co., has resigned his position, effective March 1, to go in the rubber supply business in New Orleans. He will represent several tire and sundries manufacturers.

Moving to Wisconsin—The Willard Mfg. Co. of Minneapolis, Minn., manufacturing electrical devices and specialties, is moving its plant and equipment to Chippewa Falls, Wis., which city has been selected as a permanent home. The name of the company will be changed to Chippewa-Willard Mfg. Co.

Autocar Election—At the annual meeting of the Autocar Co. of Ardmore, Pa., the following officers were chosen: President, David S. Ludlum; vice-president and production manager, Walter W. Norton; vice-president, John S. Clarke; secretary and treasurer, Edwin A. Pitts; assistant secretary and treasurer, Frank C. Levin.

Warner Gear Adds to Equipment—The Warner Gear Co. of Muncie, Ind., has recently added about \$60,000 worth of new equipment to take care of the anticipated heavy increases in production which will be in force during the next 5 or 6 months. Harry Orr, formerly of the Alco plant at Providence, R. I., becomes production manager March 1.

Change of Name—The Henricks Novelty Co., Indianapolis, announces a change in its corporate name. The company hereafter will be known as the Henricks Magneto and Electric Co. This company for some years past, has been specializing on magnetos and electric lighting outfits, and the change in name was made to be in keeping with the nature of its principal products.

Recognizes Ward Leonard Patents—The Detroit Starter Co. has recognized the validity of Ward-Leonard's recently marketed patents and have entered into an arrangement by which it is licensed to manufacture under these patents. Hereafter the product of the Detroit Starter Co. will be known as the Detroit-Ward Leonard system for starting and lighting and will continue to be manufactured in the plant of the Ross & Young Machine Co., Detroit, Mich. The officers of the Detroit Starter Co. are J. W. Fitzgerald, president; F. J. Lamb, vice-president; A. D. Porter, secretary and treasurer; H. M. Jerome, general manager.

Rutenber Changes—R. A. Vail has been made vice-president and general manager; S. R. Chenoweth has been made treasurer, and P. A. Watson, who has been superintendent for some time, has been made a director of the Rutenber Motor Co., Marion, Ind. These changes were made necessary owing to the retirement of R. O. Berger from the office of vice-president and director and of J. W. Stephenson as treasurer and general manager, both of whom wished to be relieved in order to devote their entire time to their many other and varied interests. J. W. Stephenson retains his interests in the company and his membership in the board of directors.

Coming Motor Events

SHOWS AND CONVENTIONS

February 22-27—Show, Duluth, Minn.
February 23-27—Show, Ft. Dodge, Ia.
February 23-27—Show, Syracuse, N. Y.
February 24-27—Show, Freeport, Ill.
February 24-27—Show, Battle Creek, Mich.
February 24-27—Show, Freeport, Ill.
February 26-27—Show, Findlay, O.
February—Show, Rockford, Ill.
March—Show, Shelbyville, Ind.
March 6-13—Show, Boston, Mass.
March 8-13—Show, Des Moines, Ia.
March 11-13—Show, Kenosha, Wis.
March 13-20—Show, Harrisburg, Pa.
March 17-20—Show, Elgin, Ill.

CONTESTS

* February 27—Grand prize road race, San Francisco, Cal.
* March 6—Vanderbilt cup, San Francisco, Cal.
March 17—Road race, Venice, Cal.
* May 29—500-mile speedway race, Indianapolis, Ind.
* June 9—200-mile race, Galesburg, Ill.
* June 19—Chicago speedway race.
June 25—300-mile race, Sioux City, Ia.
* July 4-5—Speedway races, Tacoma, Wash.
August 20-21—Elgin road races.
* Sanctioned by A. A. A.

Brief Business Announcements

DeGRAFF, O.—James Figley has started the erection of a garage at DeGraff.

Greenville, Mich.—George C. Snyder, until recently with the Belknap Lumber Co., will engage in the motor car business.

Reeseville, Wis.—W. F. Etscheid and Elmo Hibbard have leased the garage and repair shop of Herman Schiffer and will continue the business, with Mr. Hibbard as manager. Agency lines will be selected at once.

Detroit, Mich.—W. A. Haslett, has been appointed manager of the local branch of the Goodyear Tire and Rubber Co. He was until recently manager of the company's branch in Pittsburgh, Pa.

Springfield, Mass.—H. H. Bierman has resigned as manager of the Springfield Buick Co. and he has formed the Springfield Reo Co. with H. P. Gates. George A. Mevis has been appointed manager of the Buick agency.

Racine, Wis.—The Electrical Shop has been established at Racine, by William Pratt, Kerner Brandeis and Fulton Thompson. The corporation is capitalized at \$5,000 and will make a specialty of repairs on electrical devices.

Green Bay, Wis.—R. L. Hooker and L. Kittell, of Green Bay, Wis., have resigned their positions as locomotive engineers to open a garage at 313 North Monroe avenue under the style of Sphinx garage. The company will represent the Sphinx and do a general garage and repair business.

Delavan, Wis.—Eugene Fey and Harvey Zillhart have formed a partnership under the style of Fey & Zillhart to do a general sheet metal working business. The Chesebrough building at 123 South Second street, just completed, has been leased. A department for the manufacture and repair of fenders,

hoods, and other motor car specialties will be maintained.

Bancroft, Mich.—A garage and harness store will be opened here shortly by E. C. Bolt.

Omaha, Neb.—The Firestone Tire and Rubber Co., has leased a piece of ground 38 by 140 feet, at Farnam and Twenty-sixth streets and has contracted for a three-story and basement building to house its local salesrooms and offices.

North Yakima, Wash.—W. W. Sheane of the Central Auto Co. and M. D. Baker of the Baker Motor Car Co., both of North Yakima, have combined business interests and will operate under the name of the Central Auto and Supply Co.

Dayton, O.—C. R. Dunwoody, is now handling the Dayton airless and Dayton pneumatic tires in the states of Georgia and Florida. W. E. Trenchard of Columbia, S. C., has been appointed dealer for this line for the state of South Carolina. E. N. Mackey of Hartford, Conn., is another appointee.

Columbus, Wis.—William Schultz has purchased the interest of Jacob Harder in the Schultz-Harder garage at Columbus, and on March 1 will take occupancy of the Schmidt garage, where the business will be continued. Mr. Harder intends to establish a garage at some point in Iowa.

New York.—Clodio & Engs, Inc., with offices at 1696 Broadway, formerly occupied by the Kissel Motor Car Co., have taken over the distribution of the Kissel for the metropolitan district. R. L. Engs, who has been identified with the Benz Automobile Sales Corp. will assume the presidency of the company. The management of the Benz

business in this country has been left in the hands of P. V. Clodio.

Providence, R. I.—The Saxon Motor Car Co. has been formed at Providence, to handle that make of car here. Salesrooms have been opened at 82 Matthewson street.

Roberts, Wis.—E. A. Sutherland has sold his garage and implement business, including the Ford agency to Ben and Arthur Templeman, who will continue the business as Templeman Bros. Mr. Sutherland will establish a garage in Hudson, Wis., on April 1, handling the Ford in Hudson and vicinity.

Oconomowoc, Wis.—Local business men have organized the Oconomowoc Oil Co. with a capital stock of \$10,000 to establish a tank wagon system and warehouse for the distribution of gasoline, oils, greases and other supplies to motorists of the city and the many summer homes on the lakes in this vicinity.

Detroit, Mich.—Chandler cars now are being handled here by the Gordon Auto Sales Co., 1000 Woodward avenue. A company recently organized and which will be incorporated with a capital stock of \$25,000. Besides W. J. Gordon, those associated with him are F. E. Hollister, H. W. Jameson, W. G. Lynn and E. Turner. The company also handles the Ohio electric cars.

Grand Rapids, Wis.—The Prentiss-Wabers Mfg. Co. of Grand Rapids, organized recently with \$25,000 capital to manufacture gasoline and oil guages, auxiliary chairs, motorists' cooking and luncheon sets, etc., has leased for 3 years the former Wiperman table factory at Grand Rapids and will start operations about March 1. The officers of the new corporation are: President, T. A. Taylor; vice-president, D. B. Phillee; secretary

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

| Town | Agent | Make | Town | Agent | Make |
|-------------------------|-------------------------|------------|------------------------|---------------------------------|-----------|
| Ashtabula, O. | Kain & Brookway | Buick | Greenville, Mich. | Hansen and Lyman | Maxwell |
| Allentown, Pa. | M. H. Kemmerrer | Pilot | Greeley, Colo. | Schoomaker & Lee Bros. Hdw. Co. | Hupmobile |
| Aurora, Ill. | Edwin J. Ellis | Pilot | Green Bay, Wis. | Hooker & Kittell | Sphinx |
| Akron, O. | O. B. France | Pilot | Grand Island, Neb. | J. P. Dugan | Grant |
| Bethlehem, Pa. | O. C. Snyder | Westcott | Hartford, Conn. | J. J. Molloy | Pilot |
| Buffalo, N. Y. | Simcott Motor Sales Co. | Westcott | Holdrege, Neb. | Lyle & Young | Grant |
| Bartley, Neb. | Leon A. Russell | Grant | Hartville, O. | H. Carper | Buick |
| Brooklyn, N. Y. | J. S. Frazee | Pilot | Huntington, Ind. | Peoples Garage | Westcott |
| Brockville, Ont. | A. C. Miller & Co. | Pilot | Huntington, Ind. | D. E. Lauferty | Pilot |
| Berthoud, Colo. | Berthoud Garage Co. | Grant | Hartford, Conn. | Harry Starkle | Chevrolet |
| Bradford, Pa. | J. Rogerson | Pilot | Houghton, Mich. | Edward Mill | Pilot |
| Colorado Springs, Colo. | W. W. Price | Pilot | Hudson, Wis. | E. A. Sutherland | Ford |
| Corry, Pa. | W. E. Marsh | Pilot | Hastings, Neb. | Stephen Schultz | Grant |
| Corinth, N. Y. | Jesse I. Johnson | Pilot | Indiana, Pa. | J. L. Culp | Pilot |
| Caribou, Me. | Pitcher and Briggs | Pilot | Jackson, Mich. | H. B. Crosier | Hollier |
| Champaign, Ill. | J. L. Weise | Westcott | Kent, O. | J. B. Hannan | Buick |
| Council Bluffs, Ia. | L. P. Madsen | Westcott | Kane, Pa. | G. E. Glatt | Pilot |
| Columbus, O. | Pilot Auto Sales Co. | Pilot | LaGrangeville, N. Y. | William J. Northrup, Jr. | Pilot |
| Caldwell, O. | Norval Robey | Oldsmobile | Littletoncommon, Miss. | Thomas Moore | Pilot |
| Columbus, O. | Winders Motor Sales Co. | Chevrolet | Lincoln, Neb. | P. W. Rathbun | Grant |
| Delaware, O. | Griffith & Cone | Dodge | La Harpe, Ill. | B. N. Byler | Pilot |
| Caldwell, O. | George Radcliff & Son | Buick | Logansport, Ind. | J. I. Barnes | Pilot |
| Coshocton, O. | Standard Auto Co. | Buick | La Rue, O. | Sutton & Kniffin | Buick |
| Canal Dover, O. | Hass & Campbell | Buick | Milwaukee, Wis. | R. D. Rockstead | Saxon |
| Columbus, O. | Twyman Motor Car Co. | Chandler | Milwaukee, Wis. | Wells Garage Co. | White |
| Collingswood, N. J. | J. T. Monaghan | Pilot | Minersville, Pa. | Ike Cohen | Pilot |
| Detroit, Mich. | Gordon Auto Sales Co. | Chandler | McKeesport, Pa. | T. J. Ardinger | Pilot |
| DuBois, Pa. | E. S. Crist | Pilot | Masontown, Pa. | Masontown Motor Car Co. | Pilot |
| Denver, Colo. | Elmore Auto Co. | Pilot | Minneapolis, Minn. | Minneapolis Auto Co. | Westcott |
| David City, Neb. | E. D. Cuckler | Grant | Mansfield, O. | Pullman Sales Co. | Pullman |
| Dobbs Ferry, N. Y. | J. P. Carpehter, Jr. | Pilot | Minot, N. Dak. | Dr. C. C. Nugent | Franklin |
| Easton, Pa. | M. H. King | Pilot | Murphysboro, Ill. | George E. Craine | Pilot |
| El Paso, Tex. | W. L. Field | Pilot | Montrose, Colo. | John Hodges | Pilot |
| Glendale, Cal. | E. Bennett, Jr. | Oldsmobile | Nashua, N. H. | F. A. Littlefield | Pilot |

and general manager, G. N. Prentiss; general superintendent, H. H. Wabers.

Seattle, Wash.—H. F. Scruby has opened the Universal Service Co. at 1716-18 Broadway, where the firm will conduct an exclusive Ford service and accessory station.

Indianapolis, Ind.—Irving B. Meers has been appointed commercial manager of the Empire Automobile Co., Indianapolis. Mr. Meers was formerly connected with the Empire as export sales manager.

Detroit, Mich.—J. F. Bowman, assistant to the secretary and treasurer of the Federal Motor Truck Co., has been appointed director of sales. He has started on a business tour this week.

Philadelphia, Pa.—Patton, Fleming & Co., 2039-2041 Raustead street, manufacturers' representatives, have been commissioned by the Electric Storage Battery Co., manufacturer of the Exide battery, to act as authorized distributors and battery service depot in the Philadelphia territory.

Springfield, Ill.—Glenn Davis Smith has disposed of the Auto Inn, one of the largest garages in this part of the state, to B. G. Sutton of Pontiac, Mich. Mr. Smith will continue his agency for the Hudson and Apperson cars in this section. The Auto Inn will not, in the future, handle any agency lines.

Spokane, Wash.—Harry Hawkins, formerly agent for the Baker electric, and Harry Twitchell of the Spokane Hudson agency, have formed a new firm which will be known as the Hawkins-Twitchell Auto Co. They will handle the Hudson and the Federal trucks exclusively in the Spokane territory.

Cleveland, O.—The increasing business has made it necessary for the Chandler Motor Car Co. to add more men to its sales department force. The sales territory has been divided into two sections, each with an assistant sales manager at its head. W. G. Clay, has been appointed in charge of the eastern district and Sid Black in charge of the central district. F. G. W. Sudrow, formerly sales manager of the Marion Motor

Car Co., and Benjamin Rennard, have been appointed special factory representatives.

Portland, Ore.—H. R. Roberts, former head of the Winton branch in Portland has been made sales manager for the Frank C. Riggs Co. in this city, distributor of Packard cars.

Columbus, O.—The Excelsior Seat Co. of Columbus has taken up the manufacture of bodies for all sorts of commercial vehicles. The local agent is the Coates Motor Co., 215 North Fourth street.

Adrian, Mich.—The Maple City Specialty Co., has been organized by Burton E. Giles and Ralph Cushing, to handle motor car specialties and accessories. Incorporation papers have been filed showing the capitalization to be \$10,000.

Seattle, Wash.—Rothweiler & Co., retail sales agents of Ford cars, have been named as distributors of the Cole car in King county north of Auburn, Wash., and the counties of Skagit, Snohomish, Whatcom and Kittitas in the state of Washington.

Troy, O.—The Troy Wagon Works Co., has named J. L. Keir, manufacturers' agent, of Philadelphia, as its representative in that city. Mr. Keir's offices are in the Abbott building, at Broad and Race streets. He will handle Troy motor truck trailers, reversible traction-drawn wagons, and dump wagons.

Lancaster, O.—The Overland garage, located on West Main street and owned by L. E. Huddle, was completely destroyed by fire recently entailing a loss of approximately \$80,000. About sixty cars of all kinds were burned. The garage caught fire through the back fire of an engine and a number of gasoline explosions occurred. Ten new cars were saved from the flames.

Grand Rapids, Wis.—The Prentiss-Weaver Mfg. Co. has been organized at Grand Rapids, and incorporated with \$20,000 capital, to manufacture a line of metal motor car and farm specialties, including a gasoline gauge, metal auxiliary seats, campers' cook stoves, etc. The incorporators are T. A. Taylor, D. B. Philleo and G. O. Babcock, all of Grand Rapids. This is the concern

which G. N. Prentiss of Racine, Wis., inventor and patentee of the devices, has been forming at Grand Rapids for some time.

Detroit, Mich.—K. W. Nadler is representing the Cotta Gear Co. of Rockford, Ill., in this city, not the Cotta Transmission Co. as stated in Motor Age recently.

Minneapolis, Minn.—The Heinze Electric Co. has opened a branch office at 33 South Eleventh street, in charge of William Edwards, formerly manager of the branch in Kansas City.

Milwaukee, Wis.—Frank Schultz, operating a garage at 916 Forest Home avenue, Milwaukee, has filed a voluntary petition in bankruptcy, scheduling assets at \$8,099 and liabilities at \$5,692.

Akron, O.—The Excel Rubber Co. is preparing to move its plant from Akron to Wadsworth, O., where a factory site has been secured near the Erie Railroad. The capital of the company recently was increased from \$10,000 to \$50,000.

Milwaukee, Wis.—The Wisconsin Waste Co. has been organized at Milwaukee, Wis., to make a specialty of dealing in waste for garages, machine shops and factories. The office is at 228 Muskego avenue and warehouse at 256 Reed street. The owners of the concern are Harry E. Jacobs and L. D. Fisher.

Portland, Ore.—The H. C. Skinner Co. has opened in Portland at 58-60 Thirty-third street as factory distributor of Maxwell motor cars for the state of Oregon and the six southern counties of the state of Washington. Thirty retail dealers' agencies throughout the states already have been established.

Detroit, Mich.—The Wolverine Bus Co., has been organized and incorporated, the capital stock being \$6,000 of which half has been paid in. The incorporators are Maurice M. Wolff, Eli Cohen and Miss Florence Wolff. This is the first jitney bus company to be incorporated in this city and operation has been started with a motor bus carrying twenty passengers.

Recent Agencies Appointed by Motor Car Manufacturers—Continued

PASSENGER CARS

| Town | Agent | Make | Town | Agent | Make |
|--------------------|-------------------------|------------|---------------------|--------------------------|------------|
| North Vernon, Ind. | Litchfield Bros. | Pilot | Ravenna, Neb. | Roy Harrington | Grant |
| North Bend, Ore. | W. A. Davenport | Pilot | Rochester, Pa. | Almy Auto Co. | Pilot |
| New York | J. E. Kunkely | Pilot | Reno, Nev. | Charles P. Burns | Pilot |
| New York | Loewus Motor Sales Co. | Westcott | Reardan, Wash. | D. McLaughlin | Hupmobile |
| New Carlisle, O. | W. W. Morris | Pilot | Stamford, Neb. | David Elder | Grant |
| Nevada, Mo. | W. F. Norman | Pilot | Sioux City, Ia. | J. W. Ohlman | Grant |
| Nevada, Mo. | W. F. Norman | Pilot | Springfield, Mass. | Reo Springfield Co. | Reo |
| New Richmond, Wis. | B. and W. Garage | Overland | Shelbyville, Ky. | Sol Hopkins | Oldsmobile |
| Norfolk, Va. | C. B. Cole | Pilot | Stillwater, Minn. | L. C. Kriesel | Oldsmobile |
| Oshkosh, Wis. | Thom Automobile Co. | Dodge | State College, Pa. | M. B. Meyer | Pilot |
| Ord, Neb. | Frank Beran | Grant | Somerville, Mass. | E. O. Hayes | Pilot |
| Oshkosh, Wis. | Thom Automobile Co. | Overland | Seattle, Wash. | Pilot Car Sales Agency | Pilot |
| Osceola, Neb. | Charles E. Hansen | Grant | Swedeburg, Neb. | A. J. Olson | Grant |
| Oshkosh, Wis. | Thom Automobile Co. | Studebaker | Spokane, Wash. | Hodgins-Fosdick Co. | Haynes |
| Pueblo, Colo. | E. I. Crockett | Pilot | Tipton, Ind. | F. U. Campbell | Pilot |
| Polk, Neb. | R. H. Thesing | Grant | Tampa, Fla. | Westcott Motor Sales Co. | Westcott |
| Providence, R. I. | Saxon Motor Car Co. | Saxon | Trenton, Neb. | A. H. French | Grant |
| Providence, R. I. | Longley Motor Sales Co. | Munroe | Fredonia, Wis. | Edward C. Clauss | Dodge |
| Philadelphia, Pa. | Pratt and Moser | Pilot | Two Rivers, Wis. | R. H. Suettinger | Buick |
| Peoria, Ill. | Westcott Garage | Westcott | Troy, N. Y. | John J. O'Hare | Pilot |
| Pittsburgh, Pa. | Pilot Motor Car Co. | Pilot | Vincennes, Ind. | J. C. Hellert | Pilot |
| Providence, R. I. | H. E. Bradford | Pilot | Whitesboro, N. Y. | J. H. Owens & Sons | Pilot |
| Plattsburgh, N. Y. | James A. Lynch | Pilot | Wadestown, W. Va. | Jess O. Clark | Pilot |
| Portland, Pa. | E. P. Bogert | Pilot | Washington, Ia. | J. E. Griffith | Pilot |
| Prague, Neb. | John Pabian | Grant | Winesburg, O. | Daniel Kinsley | Buick |
| Ravenna, O. | The Auto Shop | Buick | White Plains, N. Y. | Frank H. Briggs | Pilot |
| Roberts, Wis. | Tempelman Bros. | Ford | | | |

COMMERCIAL CARS

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| Connorsville, Ind. | George A. Beeson | Koehler | New Bern, N. C. | D. H. Gaskine | Koehler |
| Hartford, Conn. | Edward S. Clark | Krebs | Worcester, Mass. | Madert Sales Co. | Dart |
| Galveston, Texas | John Christensen & Co. | Koehler | Wilmington, N. C. | Ford Auto Co. | Koehler |

The Motor Car Repair Shop

IN every gravity fuel system there must be some means of air entering the tank at the top to take the place of the gasoline which is drawn by the carbureter. Perhaps all are familiar with the fact that when any liquid is to be drawn from a barrel, an air hole is made so that the liquid will run freely from the barrel. When this air hole is plugged up so that air cannot enter, the flow is very slight.

The same thing applies to the gasoline tank. The fuel will not leave the tank unless there is some communication with the atmosphere to force it out. In all tanks of this kind, a hole is usually drilled in the filler cap, which though very small, is sufficient for the purpose.

An annoying stopping of a car is recorded due to this small hole getting clogged with dirt. The symptoms to the driver were the same as if he were out of fuel, but inspection of the tank proved that this was not the trouble. Of course, as soon as the cap was removed, sufficient air was let in to make the flow continue for some time. But as the air became exhausted again, the car performed as before, and stopped.

After following several wrong ideas as to the cause, it was finally discovered that the carbureter was not getting gasoline. Then the fuel supply line from the tank was removed and examined, only to find it in good condition. This puzzled the owner for some time until he hit upon the real cause as an almost last resort. The cause was so simple as to be almost laughable when it was discovered, but it was annoying, and had the owner known it, he would have saved himself several days of trouble.

Care of Top

The top is one part of the motor car which gets very little care or attention from the average owner. Only when it starts to leak or to crack does he take any notice of it, and then blames it for its condition. Some suggestions as to its care may not be amiss, therefore. The only means of removing dust from the top material should be with a dry brush. Never use gasoline, for that will act upon the rubber in the material, causing it to separate and crack with leaking as the immediate result. Soap and warm water are the best materials for removal of grease spots, but it is a mistake to put any other cleaning agent in the water for the reason cited.

This method of removing spots is also applicable to the inside of the top, and here, too, a dry stiff brush is the best thing to use for getting off dust. There are several things to remember in the lowering of the top also. First, do not

Hints for the Amateur

lower it while it is damp, for dampness is liable to make it mildew if left down in this condition for any considerable length of time. Be sure to have all the folds as smooth as possible, as it is bad to crowd one part due to bunches when the envelope is put on. This bunching may result in bad wrinkles and possible cracks. Then, too, see that the clamps or other means of holding the folded top in position are securely fastened so that there will be no shifting or jumping of the parts of the top with consequent chafing and wear to the fabric.

Towing a Car

Not one of us likes to think of getting towed home, but it may happen when least expected. Therefore, it is well to remember that when attaching a rope to a car, it should not be arranged to pull on the axle, for then the strain all comes on the springs. Fasten the rope to one of the front portions of the frame, so that the pull comes on the chassis and does not go through the springs. The same thing applies to the attachment to the car

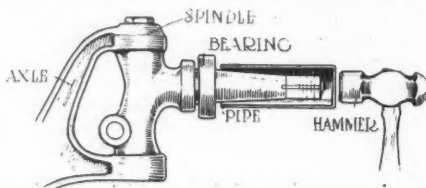


Fig. 1—Method of replacing bearing by means of a piece of pipe

which is doing the towing—if it happens to be a car. Do not tie the rope to the housing of the rear axle but rather fix it to some part of the frame.

Dirty Muffler a Power Loss

A loss of power sometimes may be traced to a clogged or dirty muffler. When the devious passages for the gases through it are stopped up, due to deposits of soot or other matter in the exhaust, a considerable back pressure is set up. The engine must work against this pressure and its efficiency naturally is lowered. A clogged muffler is not apt to be found on a comparatively new car, but those which have been in service for some time often are burdened with them.

Tap the outside of the muffler with a hammer or wrench, and any hard deposit will be loosened. Then start the motor and open it up for a few minutes to blow out the soot and other deposit. A thorough cleaning of the muffler can best be accomplished by dismantling it and cleaning all the parts by scraping any deposit from them. Be careful to reassemble the muffler correctly so that there

is no interference with the gas passage. Often the muffler condition is responsible for a marked falling off in power, which fact will be readily appreciated after it has been cleaned.

Putting Bearing on Shaft

In replacing a bearing upon a front-wheel spindle to which it is a tight fit, the mistake often is made of slipping the bearing onto the taper part of the spindle and then forcing it home against the inner shoulder by putting on the wheel behind it, and then using the latter as a hammer so that wheel and bearing are forced onto the spindle at the same time. This is a very bad practice, as the strain of driving the bearing in this way may result in breaking the hardened shoulder of the inner race which is designed for wear and is not intended for sudden shocks of this kind. The best way to do is to slip a short length of pipe over the spindle as shown in Fig. 1. The inner end of the pipe should go against the inner race of the bearing. Hammer the outer end carefully, and the bearing will move into place safely and properly.

Carry Starting Crank

Most cars of today are fitted with electric cranking systems, and the starting crank of the past is forgotten. No longer does it hang in a strap from one of the frame side members, but reposes under the seat or in the tool kit so that should the electric cranker get disabled, the driver can take off the cap over the end of the crankshaft connection and put it in place ready for arduous labor of turning the crankshaft by hand.

But be sure that you have this emergency crank in your tool kit. The predicament of one driver is recalled as an illustration. He got stalled out in the country one day and his electric cranking system failed to work. He searched through his tool kit, his luggage compartments and other places of carrying things but could not find the emergency crank which he had never had occasion to use before since he owned the car. Soon another motorist came along and was appealed to, but his emergency crank would not fit.

After waiting about an hour, a car of the same make as his own came along, and with the aid of the crank from that machine, he was able to get started. On arriving home, he found his own crank resting peacefully on a shelf in his garage. It had been carelessly removed from the tool compartment some time previously, and had never been thought of again until it was very badly needed. Don't let that happen to you.

Atwater Kent

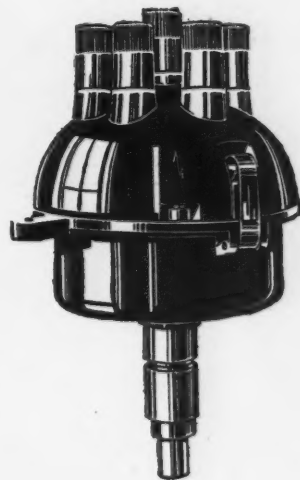
Ignition Dependability

AFTER all, the most vital quality in an ignition system is not its economy, ingenuity, or brilliancy of performance. It is just plain *fitness to be trusted*.

ATWATER KENT IGNITION

is not new, except in details. For ten years it has been proving its perfect dependability. With the Automatic Spark Control added, it is today giving a new meaning to the phrase "ignition service."

Some of America's foremost builders of motor cars, after long experience with every leading ignition system, have adopted Atwater Kent Ignition in preference to all other ignition equipment. They recognize its brilliancy of performance—the wonderful possibilities it opens in starting, idling, slow running and ease of control. But the vital thing that guides their choice is the fact that they *know* that their customers can trust it.

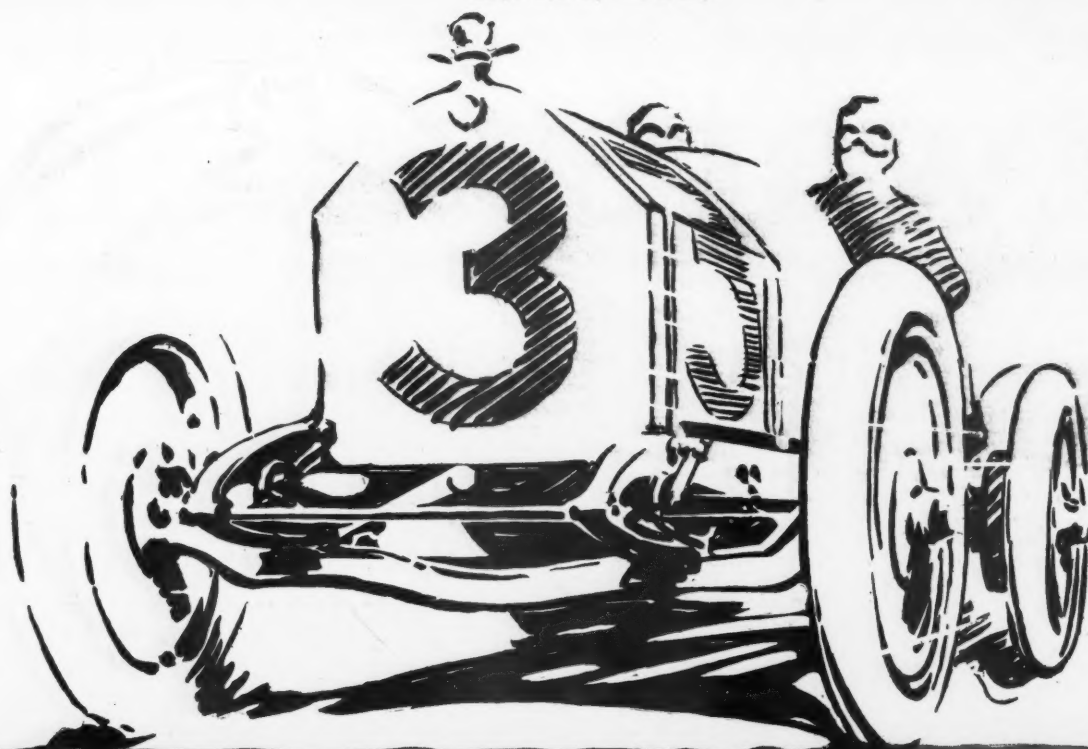


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A good ignition system is a necessary part of every engine. Batteries alone, or as a part of another system, cannot be expected to retain that essential feature of absolute reliability which an ignition system should have.

If your engine is fitted with a good magneto, you obtain your ignition current from a mechanical source, a source that practically has perpetual life, a source that cannot be made inactive by ordinary damage, nor even by forgetfulness. It is not affected by heat or cold, by rain or snow, by continuous or intermittent use.

Ignition is a factor too important to slight. It should be given more than passing consideration or comment. It should be investigated as closely and as carefully as the engine itself, for upon the ignition system the ability of the engine depends. In fact, the whole car, your comfort, your pleasure, everything depends upon the ignition system.

Don't select "any ignition"; don't be misled by such broad terms as "high tension," "jump spark," or "magneto"—insist that you be given a dependable, no-worry system—a Bosch Magneto.

Be Satisfied

*No one ignition system is used
as universally as the
Bosch Magneto*

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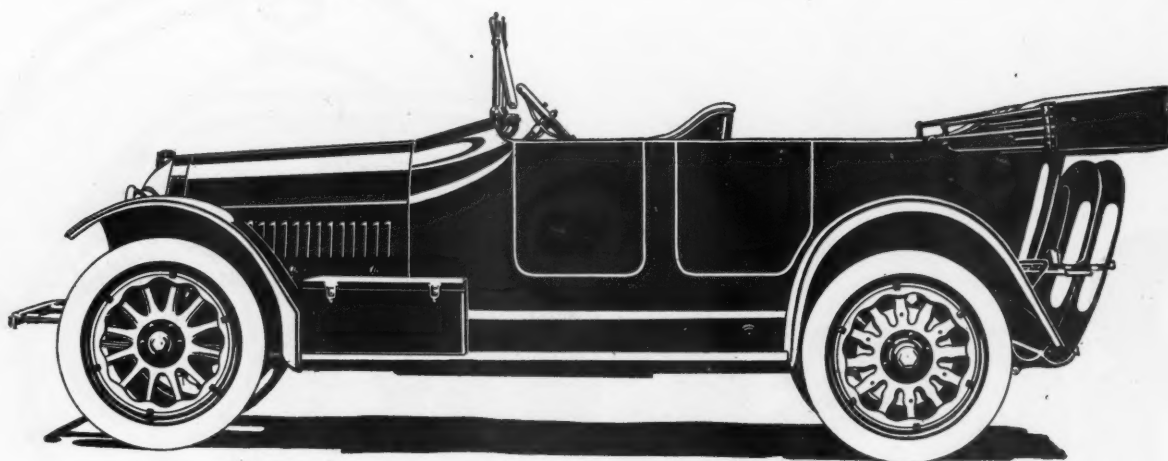
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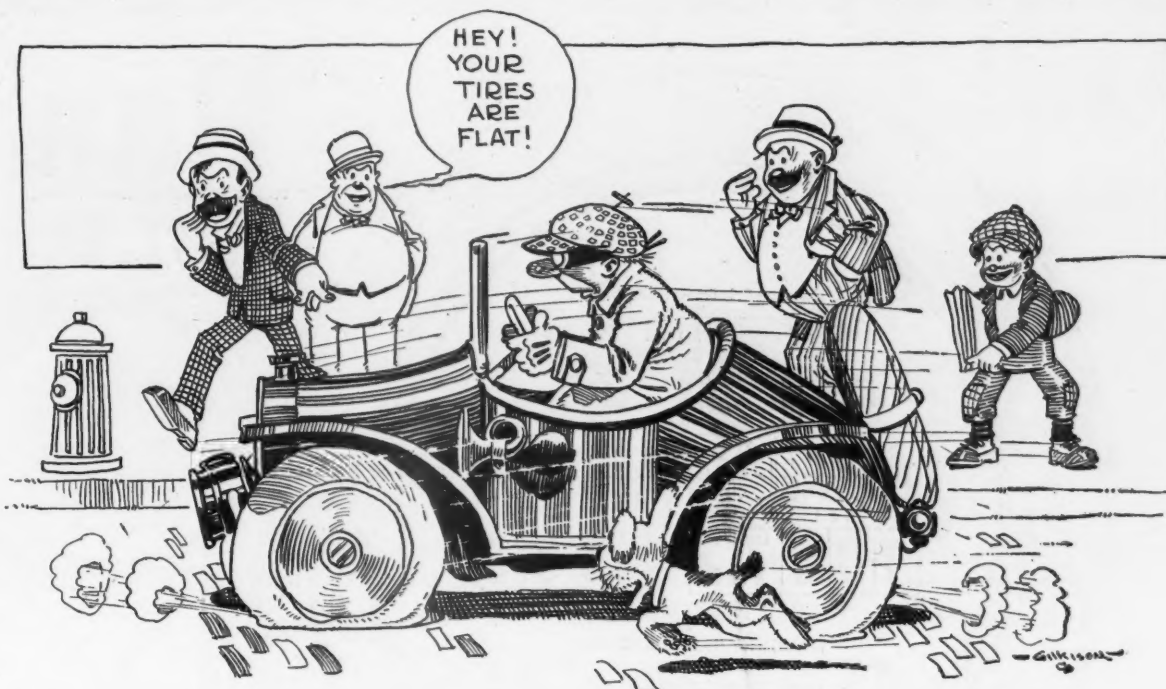
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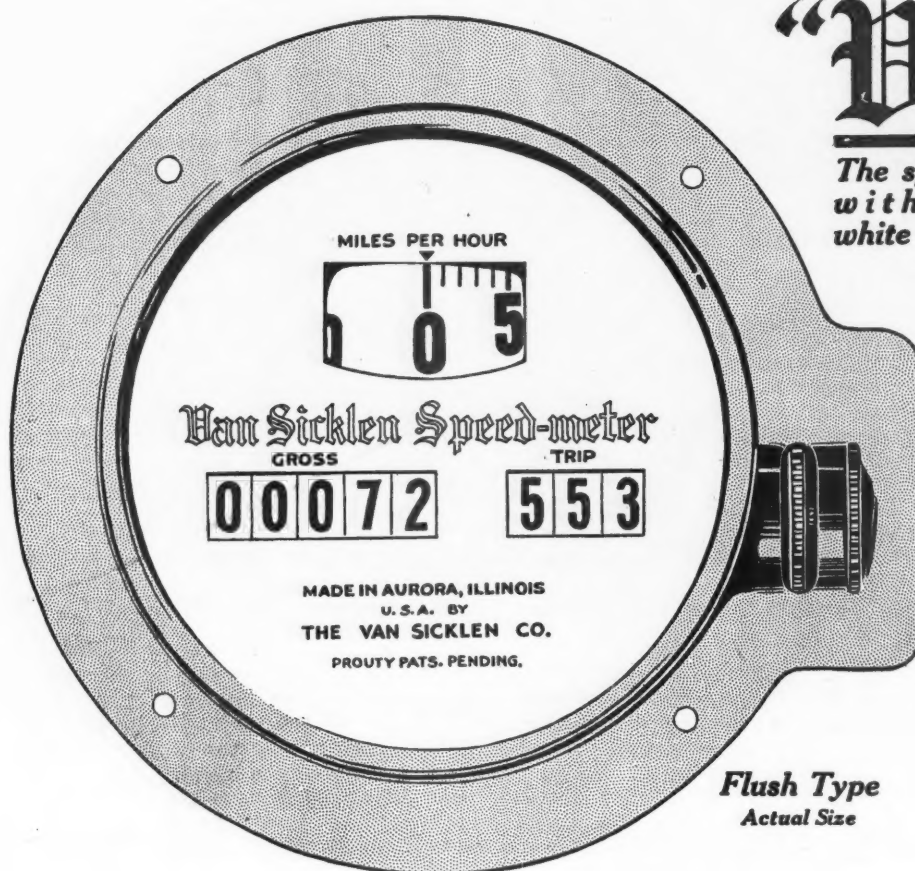
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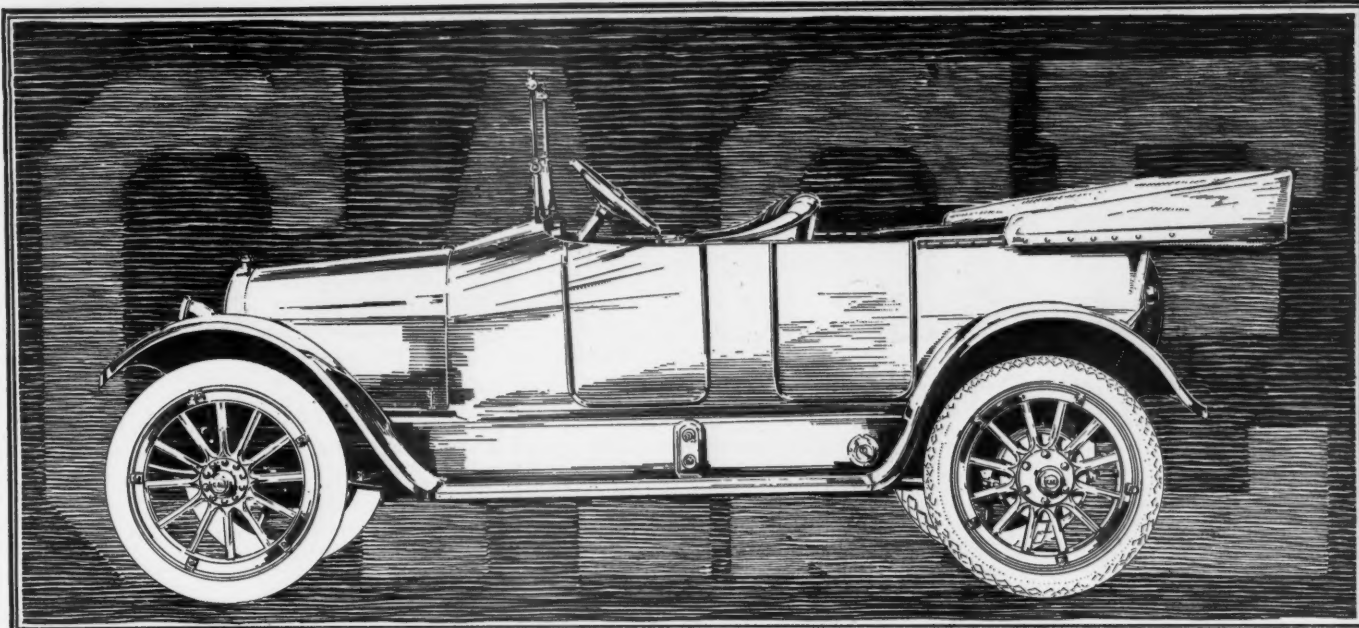


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Complete \$1350—5% Discount
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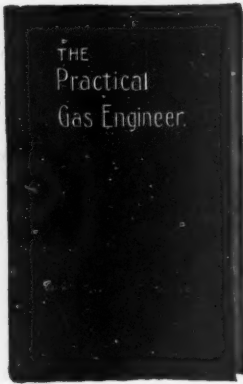
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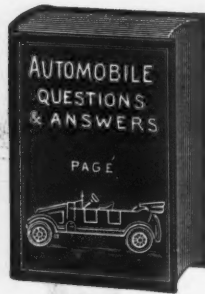
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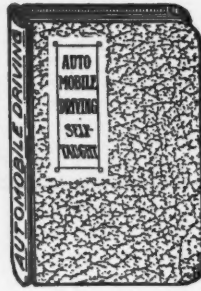
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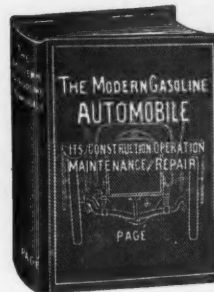
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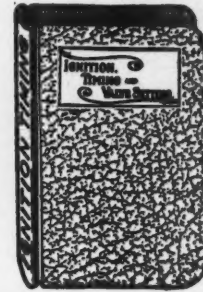
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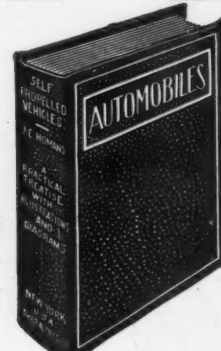
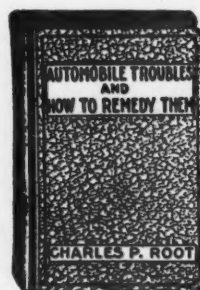
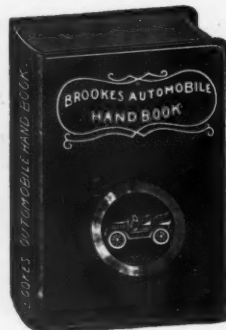
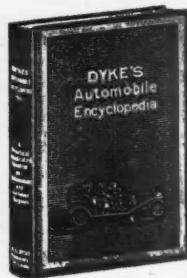
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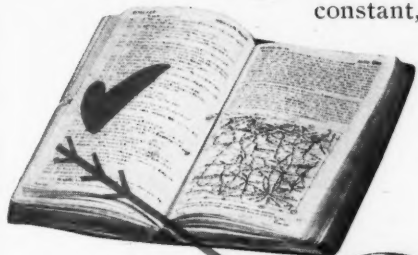


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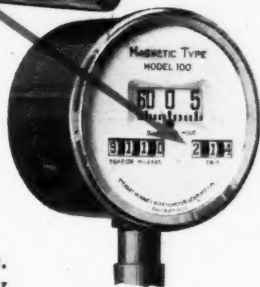
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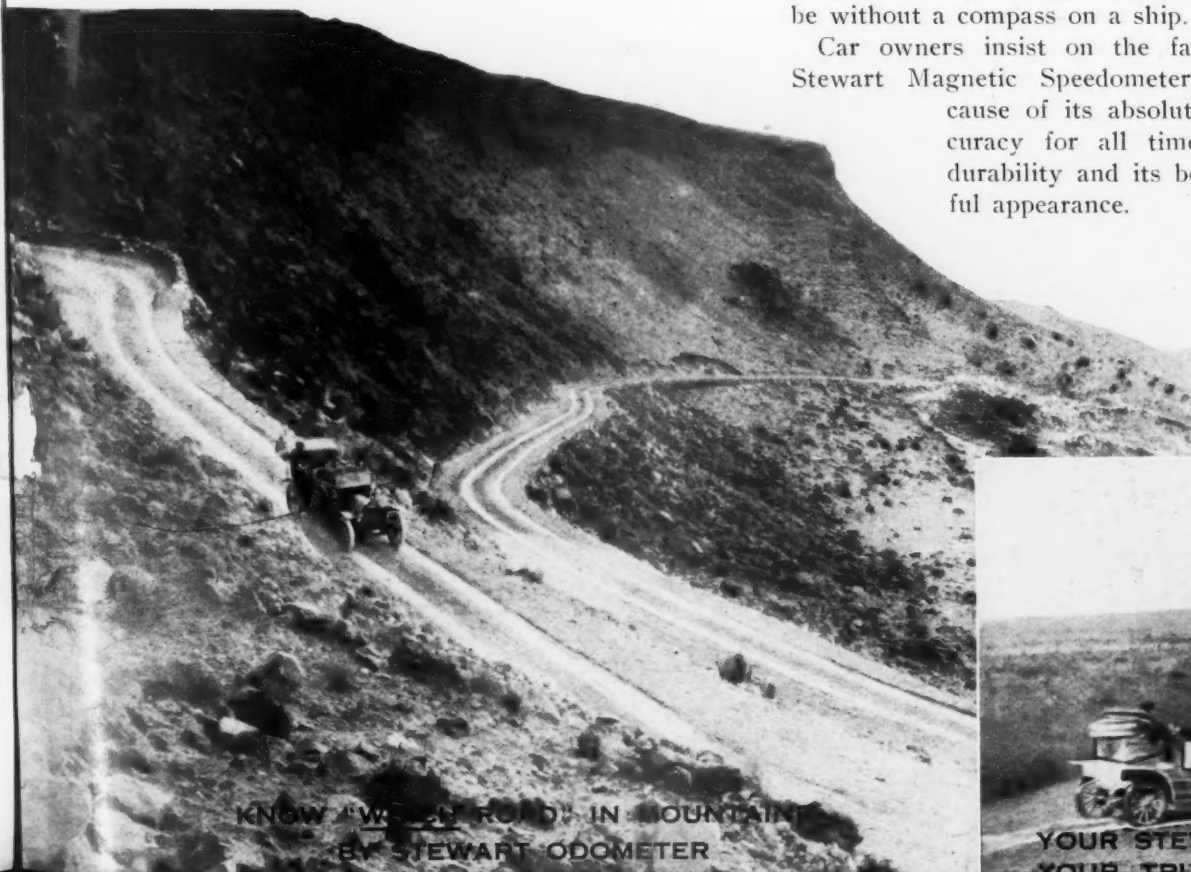


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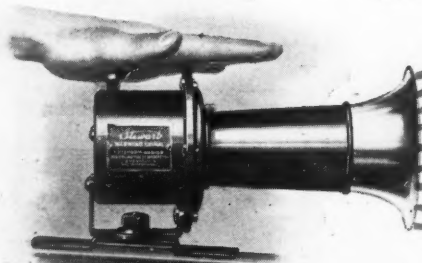
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Handsome, highly finished black enamel and nickel (or black and brass finish for Ford cars). Also models for Motorcycles and Auto Trucks.

Can be installed by anyone, on any car, in a few moments.

It is a positive necessity, which you should go and purchase today, whether you are planning a tour or not.

Guarantee

Take a Stewart Warning Signal on the tour with you. Sold with the understanding if not satisfactory after 30 days' trial, purchase money will be refunded.

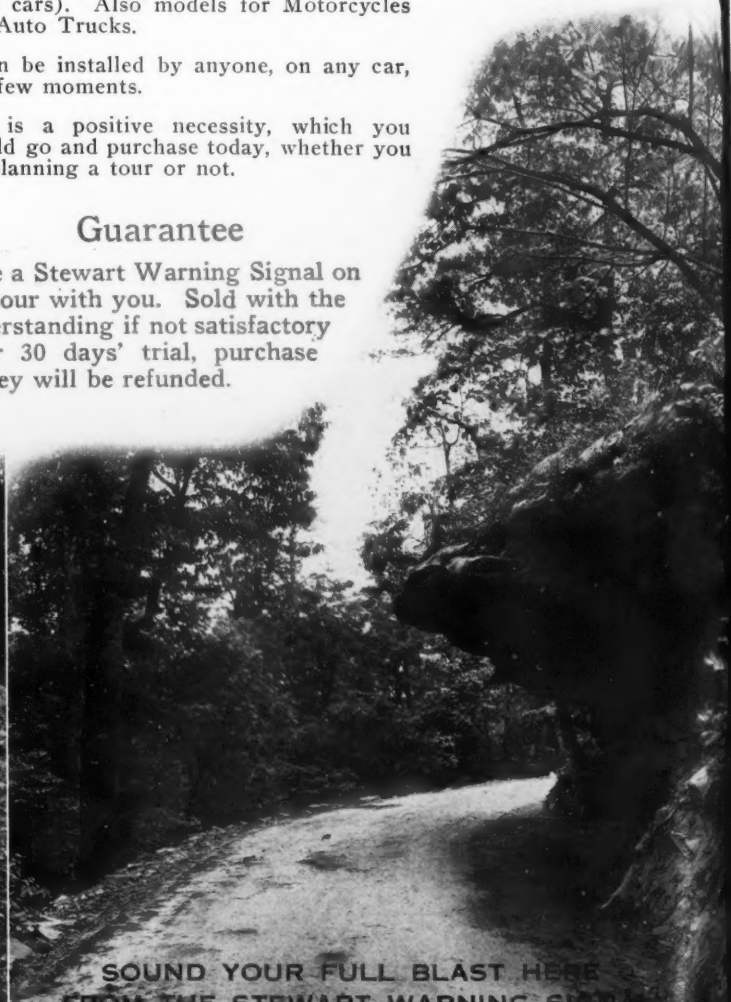
\$5

No need to pay more

Buy a Stewart Warning Signal—the first high-grade hand-operated Warning Signal sold for \$5. 1000 being bought every day. None better.



SAFELY PASS THE TURN WITH YOUR STEWART WARNING SIGNAL



SOUND YOUR FULL BLAST HERE FROM THE STEWART WARNING SIGNAL

A Stewart Vacuum Gasoline System is an Absolute Necessity When Touring

Stewart-Warner Speedometer Corporation, Chicago and Beloit, U. S. A.



ENJOY the certainty and satisfaction of knowing that you can depend upon automatic, perfect, positive, even gasoline feed down to the last drop in your tank under all conditions on levels or grades, by putting a Stewart Vacuum Gasoline System on your car.

In touring you'll need every drop of gasoline you can carry on long distances between stations on the plains and in the mountains.

No other gasoline feed system is as dependable under all circumstances as the Stewart Vacuum System, which offers the first practical solution of all gasoline feed difficulties on any car—old or new.

61 popular cars are already regularly equipped with the Stewart Vacuum Gasoline System.

The Stewart Vacuum Gasoline System should be on every car. It is more than an accessory, it is a positive necessity.

With the Stewart Vacuum Gasoline System installed on your car, the suction of the motor through manifold draws gasoline from rear reservoir to small tank under hood, from which the gasoline falls to carburetor in a positive, even flow.

No nuisance of hand pumping air into gasoline tank

before starting car. No motor air pump to keep up the pressure after you start.

No nuisance of watching air gauge; no air lines to keep tight; no air tight connections necessary anywhere.

Saves 10% to 15% gasoline. No forcing gasoline through carburetor wastefully. Will pay for itself very shortly in saving of gasoline alone.

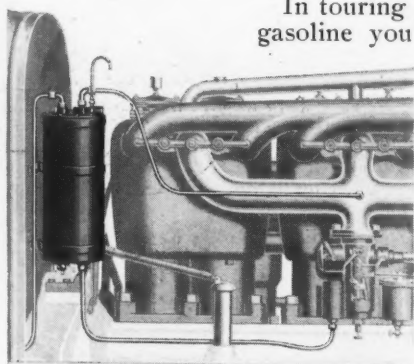
No pressure to upset correct working of carburetor.

Thousands of old cars are being made "gasoline-feed perfect" by their owners installing the Stewart System.

Works absolutely automatically—once on your car you can forget it.

Try it on a tour. At the end of 30 days' trial get your money back if it don't give satisfaction.

Bring your old car up to date by installing a Stewart Vacuum Gasoline System—anyone can put it on.

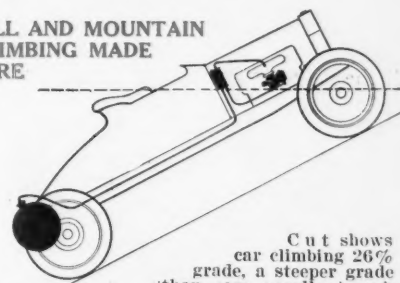


Complete
\$10

Can be installed by anyone on any car, old or new.

30 DAYS' TRIAL

HILL AND MOUNTAIN CLIMBING MADE SURE



Cut shows car climbing 26% grade, a steeper grade than cars usually travel. Note (by dotted line) that with the Stewart Vacuum Gasoline System there is constant gasoline supply always above carburetor, even on such an unusual grade as this.

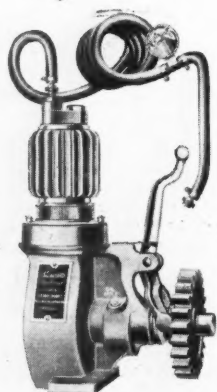
A Marmon "41," equipped with the Stewart Vacuum Gasoline System, climbed to the top of Mt. Hamilton on high gear. This is one of the longest and most difficult grades in California—365 turns in the last 7 miles.



YOU'LL GET POSITIVE GASOLINE FEED ON STEEPEST MOUNTAIN GRADES WITH THE STEWART VACUUM GASOLINE SYSTEM

ONLY THE STEWART WARNING SIGNAL CAN DO AT TURNS LIKE THIS IN THE MOUNTAINS

The Stewart Tire Pump is an Absolute Necessity When Touring



\$15

Can be installed by anyone on any car—old or new. Complete, with 15 feet of highest grade hose, accurate air gauge with bracket and gears.

30 days' trial. Your money back if not satisfactory.

Stewart-Warner Speedometer Corporation, Chicago and Beloit, U. S. A.

SAVE your energy while touring to enjoy the good things of life and let the Stewart Tire Pump do your hard work.

No need to dread the thought of tires going flat, which means getting out and doing the most laborious and dirtiest work connected with automobiling.

You or anyone can quickly and permanently attach the Stewart Tire Pump to the motor on any car, old or new. Once installed, it can be forgotten.

The Stewart will quickly and properly inflate any size tire by power of your car engine while you are putting away your old tube and tools.

When you are touring, demountable rims are of very little use. They help you to make quick changes, but they have to be pumped up then or later. It usually comes when you are tired and you can save all the

back-breaking hand-pump work if you install a Stewart Tire Pump.

And Remember—when buying a tire pump, look for these features:

Reliability is far more important than capacity. Don't be fooled by least important "capacity" talk.

Reasonable size—not a big pump to strain your motor and require a lot of lubricating, or else quickly get hot and force vaporized oil into your tires to rot them.

The Stewart is constructed to deliver all the air the pump gathers by avoiding leaks. We eliminate the **intake** valve, which is always the leakiest.

The Stewart takes in the air at bottom of stroke through screen in side and supplies pump with two outlet valves, one to check the other.

Don't think of buying a tire pump with only one outlet valve or with an "intake" valve if you want guaranteed reliability.

Buy the pump made by tire pump specialists—the guaranteed Stewart Tire Pump sold on 30 Days' Trial—satisfaction or your money back.



Electric Clock

You'll need this electric self-winding clock all the way, day and night on your tour and it will outlast your car. You can forget to wind it as it winds itself automatically. Can be attached directly to your electric system, or installed with one small dry cell. Handsome, accurate, Perfect time-keeper. Ready to install on any car by anyone. Complete....

\$15

Winds itself, so you can forget that and always know the right time.

95 Stewart Branches and Service Stations

All the way across the continent you will find our 17 Stewart Branches and 78 Stewart Service Stations in all cities and large towns.

And you will find that the fact that you have Stewart Necessities on your car will get you most prompt attention for your other needs when you drive into any town

or city on your way and see the Stewart Dealer, who is always a leader.

The name "Stewart" stands back of every Stewart Product, guaranteeing Prestige, Quality, Service and Satisfaction always, wherever you go.

EXECUTIVE OFFICES: 1826-52 DIVERSEY BOULEVARD, CHICAGO

Factories: Chicago and Beloit, U. S. A.

17 Branches

Atlanta
Boston
Buffalo
Chicago
Cleveland
Detroit
Indianapolis
Kansas City
Los Angeles
Minneapolis
New York
Philadelphia
Pittsburg
St. Louis
San Francisco
London
Paris

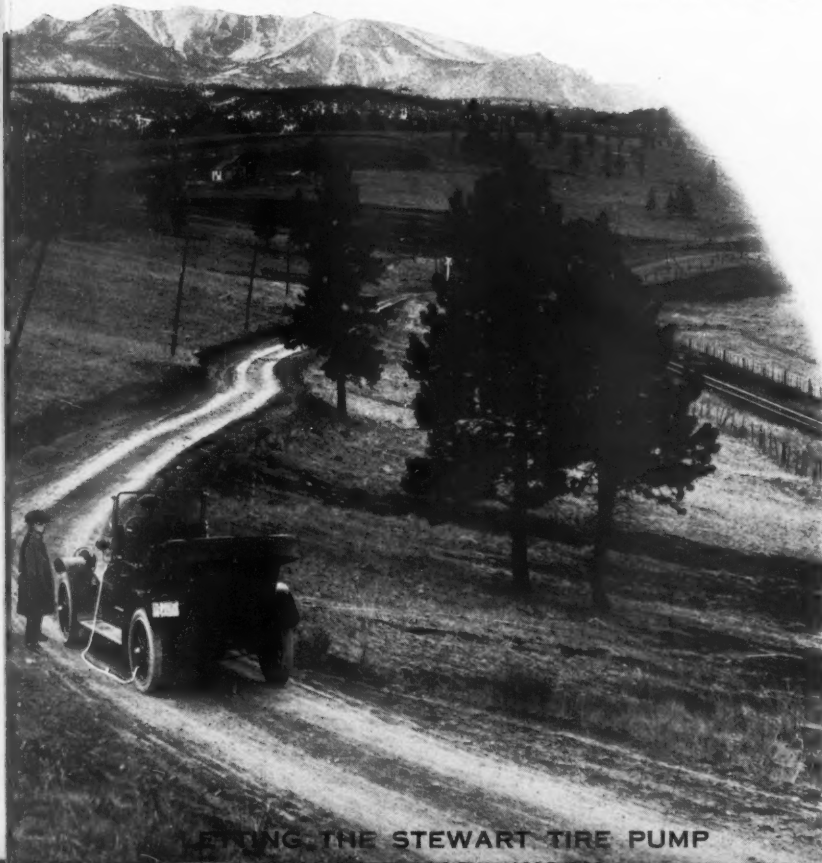
Birmingham
Phoenix
Bakersfield
Fresno
Los Angeles
Oakland
Sacramento
San Diego
San Francisco
Denver
Hartford
New Haven
Washington
Jacksonville
Tampa
Atlanta
Chicago
Indianapolis
Cedar Rapids
Davenport
Des Moines
Sioux City
Wichita
Louisville
New Orleans
Portland
Baltimore
Boston
Springfield
Worcester
Grand Rapids
Detroit
Minneapolis

Duluth
St. Paul
Kansas City
St. Louis
Omaha
Reno
Newark
Trenton
Albany
Binghamton
Brooklyn

Toledo
Youngstown
Oklahoma City
Portland
Erie
Harrisburg
Philadelphia
Pittsburgh
Scranton
Wilkes-Barre
Providence
Memphis
Nashville
Dallas
El Paso
Houston
San Antonio
Salt Lake City
Norfolk
Richmond
Seattle
Spokane
Tacoma
Beloit, Factory
Beloit, Wis.
Milwaukee
CANADA.
Vancouver
London
Toronto
Winnipeg
Montreal
Regina

If you need information, advice, or assistance, call on these stations. They are at your service.

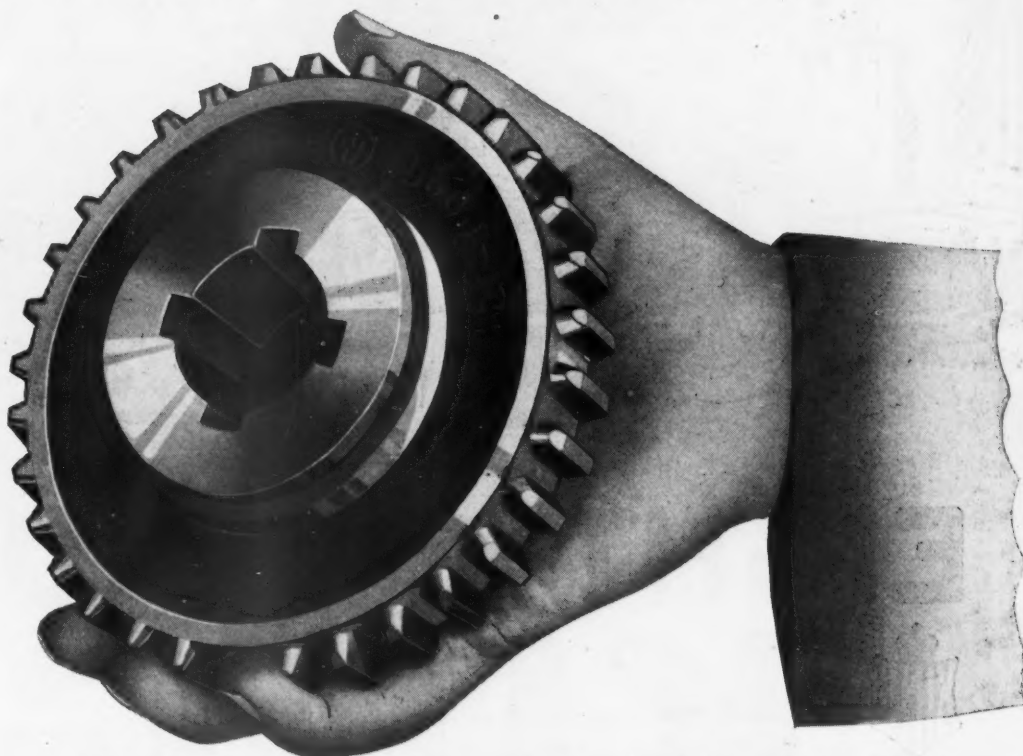
Buffalo
New York City
Rochester
Syracuse
Utica
Albuquerque
Fargo
Cincinnati
Cleveland
Columbus
Dayton



WARNER

"THE RECOGNIZED STANDARD"

**WHEN TWO
GEAR TEETH
MEAN
SUCCESS OR
FAILURE OF
THE MOTOR
CAR**



Why Warner Gear Company Transmissions Are Dominant

Upon just two gear teeth depends the success of the transmission—just two teeth meshing at a given instant take all the tremendous force which drives the motor car. There is no room for guess work, each tooth of each gear **MUST** be absolutely right—the steel flawless, the workmanship perfect, the heat treatment unquestionable.

The pre-eminence of Warner Gear Company transmissions—their reputation for dependability, is the result of organized effort to eliminate all possible error.

Five Warner Methods Which Safeguard the Car Manufacturer

- 1st—Chemical and physical laboratories hold all material to close specifications.
- 2nd—A modern and constantly renewed shop equipment holds machine work to closest limits.
- 3rd—Careful, scientific heat treatment under supervision of the best brains money can buy, brings out the proper hardness and toughness.
- 4th—An elaborate and costly system of inspection carefully checks workmanship after each individual operation.
- 5th—Over all the direct supervision of Warner Engineers, specialists of long experience in this branch of the industry.

Build Dependability Into Your Cars and Trucks With Warner Transmissions

WARNER GEAR CO., Muncie, Ind.

Detroit Office, Ford Building



EIGHT CYLINDER KING

\$1350
Complete

40-45
Horse-Power

It's a King Year in Motordom

The "world's first popular-priced Eight" is the most wanted car of its class because—

It is the *only* moderate-priced Eight ready for immediate delivery.

It is the *only* moderate-priced Eight with demonstrators the country over.

It is of King design and King efficiency and is built in the King factory by King workmen.

It is the *only* Eight that is completely get-at-able. Camshaft and valve guides exposed in a moment.

It has hundreds of miles of grueling road tests behind it.

It is built by a financially solid organization with a reputation for dependable cars.

A ride in it spoils you for other cars—one demonstration proves this.

NEVILLE'S "MORE-ROOM" STEERING WHEEL EXCLUSIVE KING FEATURE

TOP VIEW
NORMAL



Pushed out of way for easy entrance and exit.

May be set at different positions for driving.

SIDE VIEW
NORMAL



Absolutely rigid in any position. Nothing to wear out or loosen.

America's Original Cantilever Spring Car

DEALERS: Applications for territory will be considered strictly in the order received.

King Motor Car Co.
Detroit, Mich.

New York Agency and Showroom
Broadway at 52nd Street
New York Service Dept., 250 W. 54th St.



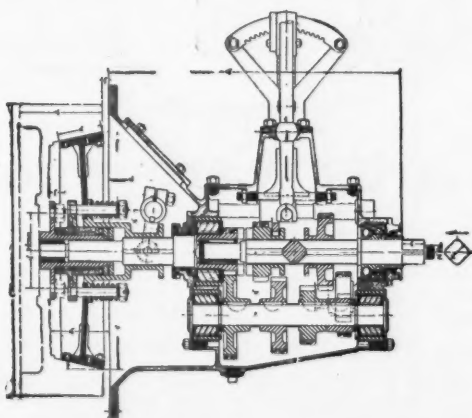
TRANSMISSIONS

Reference to current advertising and recent catalogs shows that more and more car and truck builders, who are desirous of proving the quality of their product, lay emphasis upon the presence of COVERT TRANSMISSIONS.

**FACTORY
LOCKPORT,
N. Y.**

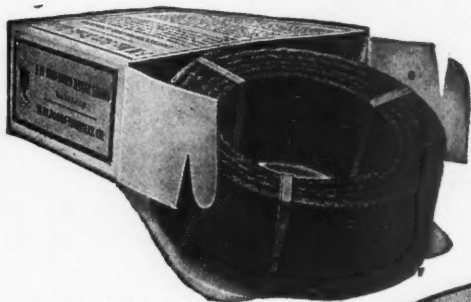
This is a tribute to quality and efficiency more eloquent than any extended argument and is a most excellent reason why you should consider its adoption in your product.

**SALES OFFICE
DETROIT
MICH.**



COVERT MOTOR VEHICLE CO.

J-M NON-BURN BRAKE LINING



Strength in Excess of Ordinary Needs

Here is brake lining equal to any emergency however great because it has many times the gripping power and strength necessary for ordinary service. It is a product of pure, long-fibred Canadian Asbestos interwoven with strong brass wire, impervious to water, oil and gasoline and absolutely free from perishable materials.

Sold in individual cartons containing pieces cut to correct size — a great time and labor saving convenience.

Economy commends it—safety demands it. Write for booklet.

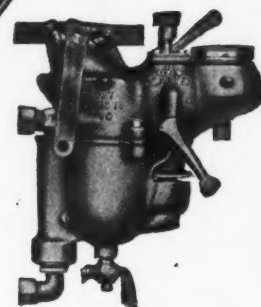
One Firm
One Service
One Guarantee

back of
every J-M
Accessory



More Than
Claims—
Guaranteed
Results

Carter Carburetor Multiple Jet



As opposed to the extravagant claims made for many carburetors, the Carter Carburetor is advertised as *the carburetor which must prove itself.*

When you buy a Carter you do so with the understanding that if after 30 days' use it is not giving *More Power, More Economy and More Flexibility* than the carburetor you previously used, we will re-

fund the purchase price without question, quibble or controversy. We are convinced of the greater efficiency of the Carter Multiple-Jet Principle.

We leave it to the Carter to convince you.

Made in sizes for all cars. Special outfit for Ford cars, complete with all attaching parts, \$17. Write today for the Carter booklet.

3026

H·W·JOHNS - MANVILLE CO.

Akron
Albany
Atlanta
Baltimore
Birmingham

Boston
Buffalo
Chicago
Cincinnati
Cleveland

Columbus
Dallas
Dayton
Denver
Detroit

Duluth
Galveston
Houghton
Houston
Indianapolis

Kansas City
Los Angeles
Louisville
Memphis
Milwaukee

Minneapolis
Newark, N. J.
New Orleans
New York
Omaha

Philadelphia
Pittsburgh
Portland, Ore.
Rochester
St. Louis

St. Paul
Salt Lake City
San Francisco
Seattle
Syracuse

Toledo
Washington
Wilkes-Barre
Youngstown

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED

Toronto

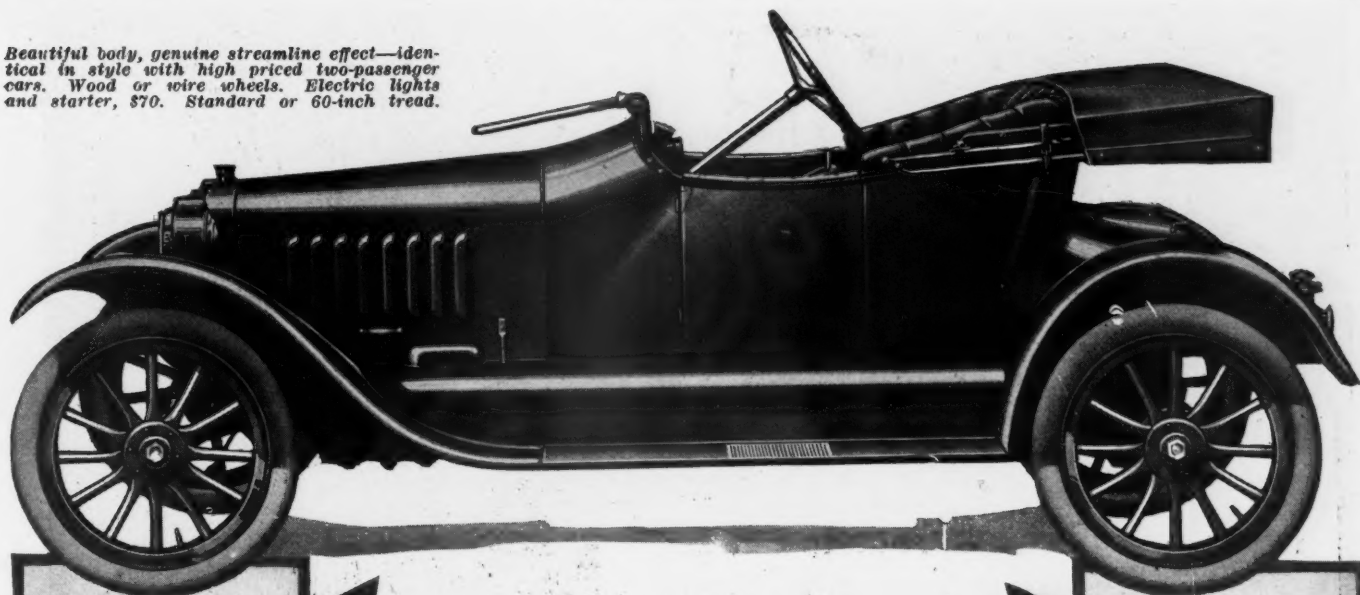
Montreal

Winnipeg

Vancouver

When Writing to Advertisers, Please Mention Motor Age.

Beautiful body, genuine streamline effect—identical in style with high priced two-passenger cars. Wood or wire wheels. Electric lights and starter, \$70. Standard or 60-inch tread.



\$395
What
it
Costs
to
OWN
one

SAXON

The Car That Makes
Both Ends Meet

The Saxon has removed the last objection anyone ever had to owning an automobile—the *price* reason.

$\frac{1}{2}$ cent
per Mile
What
it
Costs
to
RUN
one

FOR the first cost of the Saxon places this sturdy car within reach of everyone. Its price is \$395.

And the after cost of the Saxon keeps it within the means of everyone. Saxons average half a cent a mile in operation cost—one-fourth of a cent per mile per passenger.

And the Saxon stands up. It endures the hardest kind of usage without flinching. Many thousands of Saxons now in use all over the United States, Canada, and in foreign countries have proved the goodness of Saxon construction.

How We Can Do It

Some folks wonder how we can possibly build for \$395 a car that will do the things a Saxon will do. Good design is the answer—knowing how—having the right idea of what a light car should be and do, and then figuring out the best way to get these results at the lowest cost consistent with quality.

Our engineers had at their disposal all that has been learned about automobile building. They started from the beginning to design a light car for economical manufacture and upkeep.

For instance, they used, perhaps for the first time in this country,

a high-speed motor. A few years ago it would have been impossible to build a motor the size of the Saxon and have it deliver adequate power. Today we have a Saxon

motor at once light, powerful, efficient and very durable.

Saving 45 Parts at a Stroke

Saxon engineers found a method of spring suspension that makes a light car exceedingly comfortable to ride in and at the same time saves 45 parts. Think of it—45 parts saved by one idea of design.

No less than 15 higher priced cars have already adopted this type of springs.

And so on all through the car. By taking thought, we are able to offer for \$395 a better automobile than could be bought, only a few years ago, for five times the price. Saxon is the modern car.

Saxon "Six" \$785

For those who want a touring car, this five-passenger six-cylinder Saxon is truly an unusual value. It is generously roomy—in no sense a small car. It has 112-inch wheelbase, 32 x 3½-inch tires, 30-35 horsepower, high-speed motor, electric lights and starter as regular equipment, and many other unexpected features. And the price, too, is unexpected—\$785 fully equipped.

There is a limited amount of territory still open for dealers. Write today for information. Address Dept. M.

What Saxon Owners Say

A year ago some might have called the Saxon "an experiment." But not today. It has made good. Read what these owners say:

"I am using my Saxon over rough roads which one week will be very muddy and the next sandy. It is standing up and is doing splendid work."—W. H. Hudson, Hereford, N. C.

"My Saxon has been driven 1800 miles—mostly through heavy sand and mud. I have only spent 15c for repairs. I average about 33 miles to the gallon. Recently I went through a mud hole where three large cars had been stuck and pulled out with horses."—George L. Jacobs, Marengo, Ia.

"My Saxon has given perfect satisfaction. I have been able to get 28 to 29 miles per gallon on an average run of 600 miles. Oil consumption runs from a pint to a quart to each 150 miles."—Mrs. L. A. Gulley, Champaign, Ill.

Saxon Motor Company, Detroit



When Writing to Advertisers, Please Mention Motor Age

Hitch your Wagon to a STAR!

If you have been unfortunate and had some inferior starting and lighting battery "wished upon" you, the troubles can be eliminated by replacing with a

Gould Storage Battery

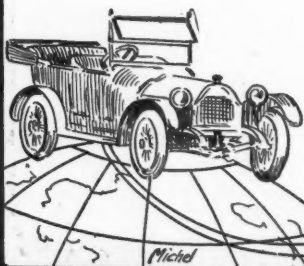
Hard paste plates assure long life as well as high capacity.

Leak-proof top vent keeps acid from creeping out.

Expansion chamber and funnel provide for real internal inspection and convenience in adding make-up water.

Eventually it will be a Gould Battery. Why not now?

Gould Storage Battery Co.



General Offices: 30 E. 42d St. New York City Works: Depew, New York

Boston—347 Newbury St.
Philadelphia — 613 Lincoln Bldg.
Cleveland — 1761-5 E. 18th St.
Detroit—Kerr Bldg.
Chicago—225 E. 22d St.
San Francisco — 1448 Van Ness Ave.
Los Angeles—110 E. Pico St.

Agents in Washington, Rochester, Buffalo, Pittsburgh, Milwaukee, Minneapolis, St. Paul, Kansas City, Omaha, Denver, Topeka, Seattle.

CANADIAN REPRESENTATIVE
R. E. T. Pringle, Toronto, Montreal, Winnipeg, Vancouver
Full stock of parts, plates and repairs carried by all offices and agents.



ARGO

MOTOR VIQUE
4 Cylinders, Shaft Drive

\$295

f. o. b. factory
Top, windshield, headlights and generator attached, \$29 extra.

Additional Dealers Wanted

From the largest city to the smallest hamlet, the market for the Argo is enormous. It opens up comfortable, economical motor-transportation, with all its joys and benefits, to a million new buyers. It will find users by the thousand among those who already have larger cars. No other vehicle ever devised makes such a universal appeal. We are signing up dealers by hundreds. And we want more dealers everywhere in unoccupied territory. The Argo is the biggest proposition in the field today—your own common-sense will tell you so. And it's made by a Company thoroughly responsible in every way.

Write quick—or come in if you can.

There's an Argo Parcel Delivery Car, too, at \$324, fully equipped, that will pay for itself in a few months in the saving of horse-keep. A hundred thousand merchants can use it profitably.

There isn't a nook or cranny of the country that we're not going to search out this year with good strong advertising copy on the Argo.

We want dealers everywhere to help us meet the demand. We've already increased our schedule of production three times—it's seven times as great as it was only sixty days ago. But our facilities are ample for a tremendous production—and that's what makes the Argo possible. We repeat—write, or, better still, wire.

ARGO MOTOR COMPANY, Inc., 600 Main St., Jackson, Michigan

THE UNIVERSAL CAR

That's a literal statement of fact regarding the Argo. For there's hardly a family above the day-laborer in financial responsibility that will not find in the Argo the best all-around investment it has ever made.

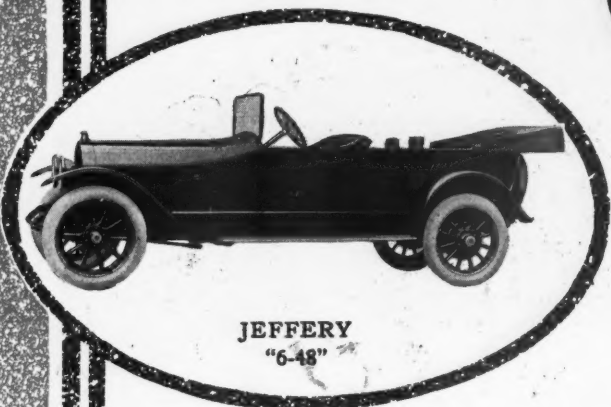
And that buyers and dealers alike realize this is shown by the fact that after our first announcement we received so many thousands of inquiries that we were forced to stop advertising until we could catch up.

Benjamin Briscoe and his associates, when they produced the Argo, accomplished a revolutionary development in motor-transportation. For, remember that the Argo is in every sense of the term a real motor-vehicle, designed and built according to the best European and American engineering practice.

The car possesses durability, comfort, style. Users tell us that the upkeep is less than carfare. It's simply a wonder. While everybody was saying "Some day it will be done"—Briscoe did it. Read these detailed

SPECIFICATIONS

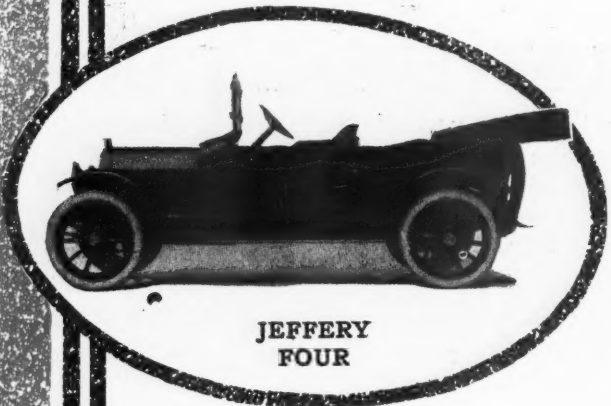
Motor: Briscoe Freres L-head type, 24x4-inch, 4 cylinders cast en bloc; 3-point suspension. **Cooling:** Thermo-siphon system. **Clutch:** Internal cone type, leather faced. **Transmission:** Sliding gear, two speeds forward and reverse. **Axle:** Front, I-beam, rear, solid alloy steel with bevel gear. **Drive:** Propeller shaft, enclosed in torque tube, through universal joint. **Bearings:** Ball bearing complete from engine to wheels. **Springs:** Full elliptic, front and rear. **Brakes:** External contracting. **Lubrication:** Self-contained constant-level splash system; sight gauge on dash. **Ignition:** Timer distributor of great battery economy. **Frame:** Pressed steel channel. **Wheels:** Wire, clincher-rim; 90-inch wheelbase, 44-inch tread. **Tires:** 28-inch. **Control:** Single pedal, spark and throttle on steering column. **Body:** Dark finish, two passenger; seat 24x42 inches; leg room 38 inches. **Gasoline:** 6-gallon tank, gravity feed to carburetor; 35 to 40 miles per gallon; speed 5 to 40 miles per hour. **Equipment:** Two side oil lamps, oil tail lamp, horn and tools.



JEFFERY
"6-48"

"SIX-48"

The JEFFERY standard of quality. Touring car and limousine. Prices, \$2,400 to \$3,700.



JEFFERY
FOUR

THE JEFFERY FOUR

The JEFFERY of quality, economy, comfort and style, at a moderate price. Touring car, roadster, limousine, sedan, "All-Weather" and combination bodies. Prices, \$1,450 to \$3,150.



CHESTERFIELD
"SIX"

CHESTERFIELD "SIX"

The distinguished JEFFERY "light six." Touring car, roadster and "All-Weather" bodies. Prices, \$1,650 to \$1,950.

The Jeffery Blankets the Field of

From chic runabout of graceful lines, to giant truck of Herculean strength—

Is the scope of the JEFFERY line.

The lively JEFFERY runabout and stylish touring car, in "fours" and "sixes" for summer—the stately limousine or cozy sedan for fall and winter—and the snug "all-weather" car for year-'round use, afford an assortment of pleasure cars that remain undisputed leaders, by achievement.

The JEFFERY Chesterfield "Six" is our newest innovation. It is the pace-maker of "light sixes" for style, service and durability.

The JEFFERY "Four" is already established as the quality car of comfort and style, at a moderate price, and the JEFFERY "Six-48" is a standard for "big six" judgment.

Among commercial cars the rugged JEFFERY "Quad"—built to army specifications, with power, brake and steer on all four wheels—stands triumphant, "The Wonder Truck of the Twentieth Century."

Where the work is heaviest, where the roads are worst, where absolute efficiency is required, and received—there is where the JEFFERY "Quad" stands the merciless test—and stands alone.



Complete Line Pleasure & Commercial Cars

And the thoroughbred $\frac{3}{4}$ and $1\frac{1}{2}$ -ton JEFFERY trucks are "Quad" quality for the lighter demand. Every JEFFERY truck—from "Quad" to $\frac{3}{4}$ -ton—performs its duty under all conditions—and performs it right.

JEFFERY cars and JEFFERY prices are always right. JEFFERY cars are built to give satisfactory service to the owner who needs \$5,000 class, at a moderate figure.

And a distinguishing feature of all JEFFERY pleasure and commercial cars is, that when they are built to give satisfactory service—they do it.

What is true of one JEFFERY, is true of the entire JEFFERY line.

Examination proves its superiority—no matter what model the JEFFERY.

Write for our catalogs, or call on your JEFFERY dealer for a demonstration. He will serve you gladly.

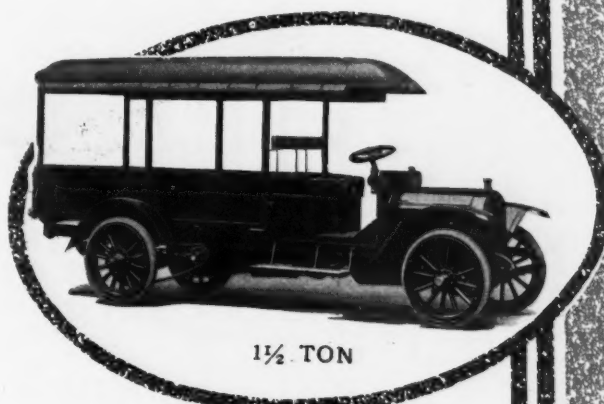
DEALERS—You should handle the JEFFERY "all-year" sellers. Write for dealers' discounts before the season gets ahead of you.

The Thomas B. Jeffery Company
Main Office and Works, Kenosha, Wisconsin



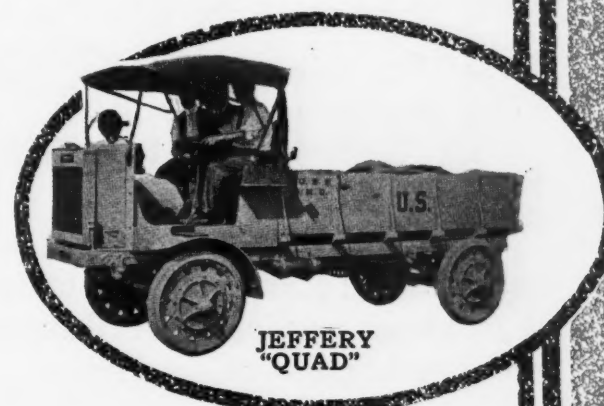
$\frac{3}{4}$ TON

JEFFERY $\frac{3}{4}$ -TON TRUCK
For department store use, and light, rapid delivery. Chassis, \$1,300.



$1\frac{1}{2}$ TON

JEFFERY $1\frac{1}{2}$ -TON TRUCK
For ordinary trucking and transfer work. Chassis, \$1,650.



**JEFFERY
"QUAD"**

THE JEFFERY "QUAD"
Solves heavy haulage problems. Drives, steers, and brakes on all four wheels. Chassis, \$2,750.



There is nothing about an automobile spring which counts half as much as the quality of its service

The quality of spring service comprises comfort and safety.



These fundamental elements dominate all others in importance.

These fundamental elements can be secured only by the practical application of scientific engineering knowledge in the design, manufacture and sale of spring equipment.

In these fundamentals Sheldon Springs excel.

If some of the devices and features characteristic of other springs are absent in Sheldon design and construction it is because they are not worth their application, or because their presence might disturb some more basic point of excellence.

THE SHELDON AXLE AND SPRING COMPANY

MAKERS OF SPRINGS AND AXLES FOR HEAVY DUTY SERVICE FOR MORE THAN 50 YEARS

WILKES-BARRE, PENNSYLVANIA

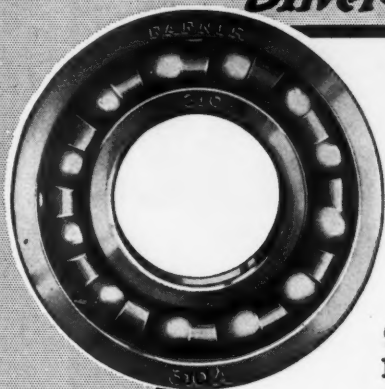
Chicago: 122 S. Michigan Blvd.

San Francisco: 444 Market St.

Detroit: 1215 Woodward Ave.

FAFNIR BALL BEARINGS

*Ray Harroun—Engineer and World's Famous
Driver—Says—They Are All To The Good*



MAXWELL MOTOR CO. INC.

565 MILWAUKEE AVE., EAST
DETROIT, MICH.

February 11, 1915.

The Fafnir Bearing Co.,
New Britain, Conn.
Gentlemen:—

In reply to your letter of February 8th would advise that the cars entered in the Vanderbilt and Grand Prize races are equipped with the Fafnir bearings as furnished by you.

Would also advise that the car in which Oldfield finished second in the Corona race Thanksgiving Day, creating a non-stop record for the distance, 301 miles, was also equipped with these bearings. Also the car which Billy Carlson finished second with at San Diego recently, creating another non-stop world's record, running 305 miles without a stop, was also equipped with these bearings.

The motors in these cars are completely equipped with ball bearings, with the exception of the wrist pins and the connecting rods. All the other bearings, including the camshaft and the main crank shaft bearings, etc., are all of your double row type of bearing.

Am pleased to say that we have had absolutely no ball bearing troubles on these cars during the year of racing which we have done with them.

Yours very truly,

MAXWELL MOTOR COMPANY, Inc.

Ray Harroun
Chief Engineer.

We might add that these bearings were bought and paid for in the regular course of business.

124-B

FAFNIR BEARING CO., NEW BRITAIN, CONN.

Seven Killed for Seven Cents

An automobile manufacturer was making out the specifications for the coming year. It came to a choice of brake lining—Thermoid or some other.

Thermoid was conceded to be superior, but it cost seven cents more per car than a competing brake lining.

The cheap lining was the usual kind, with friction surfaces but friction-shy inside—a loosely woven fabric that could not possibly remain efficient beyond a limited period.

At least one of the manufacturer's cars was bought by a novice. He drove his car poorly—used his brakes constantly—took little care of it—knew nothing about its mechanism. He took the manufacturer's word that the car was mechanically perfect.

Without going into details, this owner met with a terrible accident in which seven people were killed. Examination demonstrated that the brake lining had become useless and at a critical instant *the brakes failed*.

If Thermoid had been used, the brakes would not have failed—could not have failed.

The manufacturer had sacrificed seven lives for seven cents.

Inasmuch as he makes many thousand cars a year, how many more frightful accidents may be charged to the false economy of his purchasing department?

When a manufacturer deliberately cheapens his car to the danger point, he is morally responsible for every accident that results from that sacrifice of essential quality.

It seems inconceivable that a manufacturer will, for seven cents, take chances with so vital a safeguard as the brakes of an automobile.

Yet it is done constantly.

A manufacturer cannot plead ignorance. His engineering department can prove in a few minutes the great superiority of Thermoid over any other brake lining.

His engineers *know* and *concede* the superiority of Thermoid Brake Lining. His only possible reason for using a poorer brake lining is to save even cents on every car.

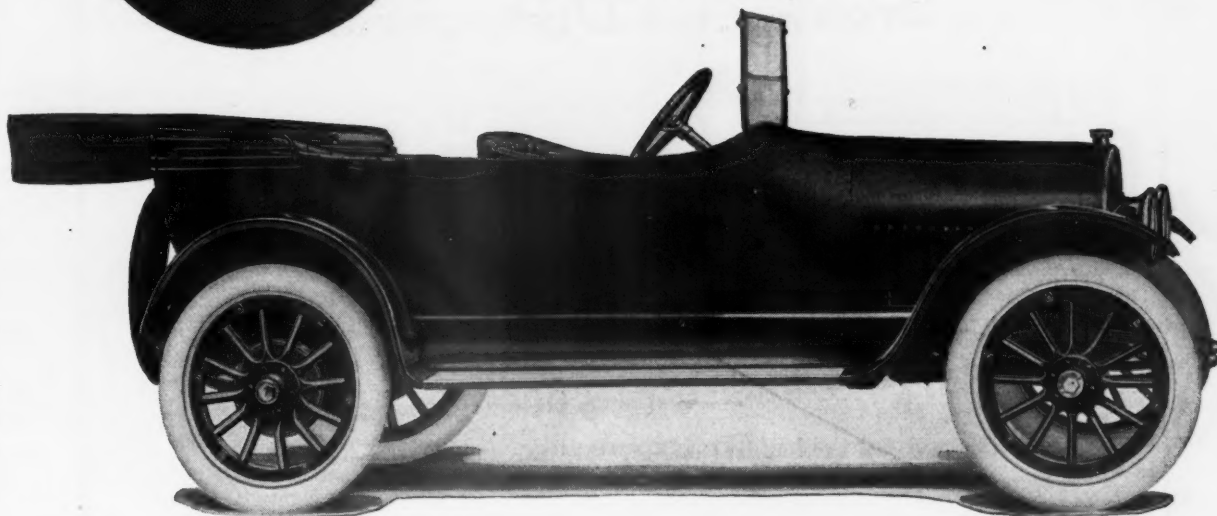
Is it worth it?

Thermoid
HYDRAULIC COMPRESSED
Brake Lining - 100%

THERMOID RUBBER COMPANY, TRENTON, N. J.



Several thousand motor car purchasers will refuse to experiment this year. They will buy a sturdy Jackson, up-to-date in style and equipment, but old-fashioned in honest workmanship.



The New Jackson "44" Offers \$1250 High Quality in Known Quantity—

IT is unfortunate that a photograph so inadequately expresses the beautiful lines and lustrous, lasting finish of this latest Jackson. In the Jackson "44" we have attained all that one could ask in beauty of line and proportion, without sacrificing in any degree the old-time sturdiness of construction and simple honesty of workmanship for which the Jackson has been famous these thirteen years.

All the refinements are complete—flush doors, concealed hinges, one-man top, two-piece rain-vision windshield, crowned fenders and rounded radiator front. Ignition and lighting switches, speedometer, ammeter and oil gauge are grouped on a metal instrument plate in the center of the dash, all illuminated by one dash light.

Specifications, Model "44"—Long stroke, four-cylinder motor, 40 H. P., Auto-Lite electric cranking, lighting and ignition system. Gasoline tank at the rear, vacuum feed. Steering wheel on left side, control levers in the center. Either front door may be used. Full elliptic springs front and rear, underslung in rear. Rear axle, floating type, two universal joints. Wheel base, 115-inch. Tires, 34x4-inch.

Jackson "48"-Six—\$1650

Jackson Olympic "46"—\$1375

DEALERS: The Jackson offers splendid and permanently profitable sales opportunities. Write us today.

JACKSON AUTOMOBILE COMPANY

1207 East Main Street, Jackson, Michigan

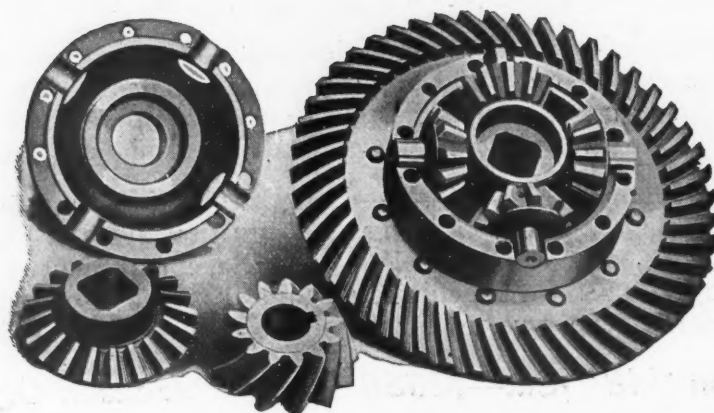
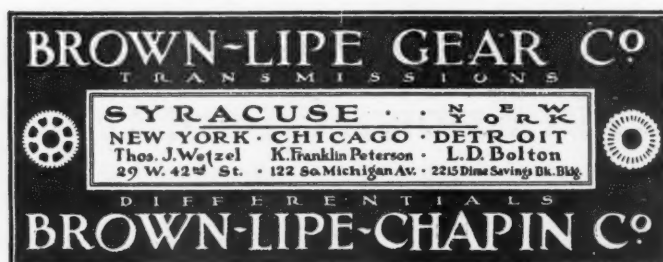
Automobile Axle Makers Who Use Brown-Lipe Differentials:

| | |
|----------------------------|---------------------------|
| American Gear & Mfg. Co. | Sheldon Axle & Spring Co. |
| Celfor Tool Co. | Timken-Detroit Axle Co. |
| Empire Axle Co. | Torbensen Gear & Axle Co. |
| Hess Spring & Axle Co. | Walker-Weiss Axle Co. |
| Liggett Spring & Axle Co. | Weston-Mott Co. |
| Salisbury Wheel & Mfg. Co. | Yuster Axle Co. |

The product of these Companies is installed in about 80% of the cars of the country, excluding one low priced.

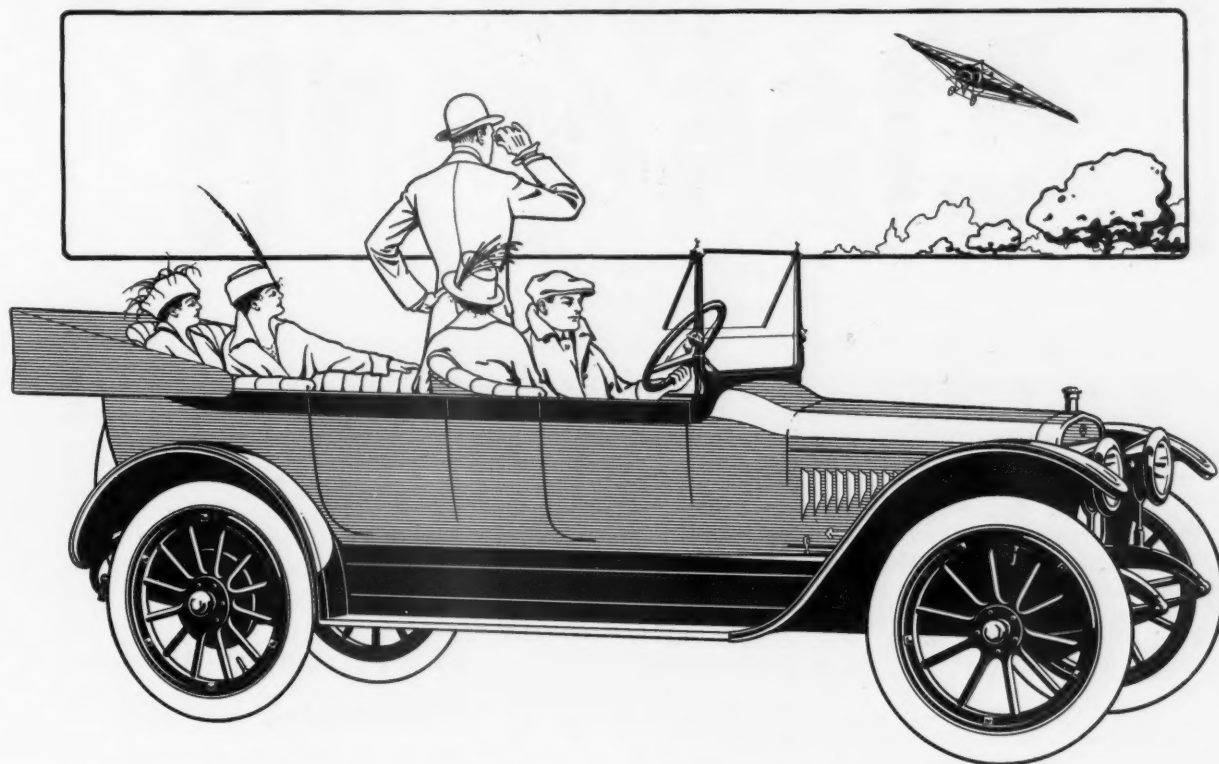
This is evidence unquestionable of
Brown-Lipe Supremacy

A few car builders manufacture their own axles—and we supply some of these.



When Writing to Advertisers, Please Mention Motor Age.

THIS IS THE CAR



Now, for absolutely the first time—a genuinely first-class six-cylinder car can be bought for less than \$3000. It is the New-Size

WINTON SIX

at \$2285—the car that went into the New York show without a single line of preliminary advertising and won instantaneous admiration. Nothing experimental or freakish, nothing veneered or false, and no striving for effect,—but just the nicest automobile creation of the year. And we finish it for you in your own personal colors.

MOTOR. Famous Winton Six-Cylinder L-head motor. 3¼ by 5¼ inches. Balanced fly wheel, crank shaft, pistons, and connecting rods. Motor, clutch, and transmission in unit power plant, completely housed.

WHEEL BASE. 128 inches.

ELECTRIC FEATURES. Bijur starting and lighting, with separate motor, generator, and storage battery. Bosch ignition.

CARBURETOR. Special type Rayfield.

CLUTCH. Five-pair dry-plate.

TRANSMISSION. Four speeds ahead and one reverse. Direct on third. Selective sliding gears. Center control, driver's seat being at the left.

DRIVE. Drive shaft has universal joint at each end. Spiral bevel gears in rear axle.

AXLES. Drop-forged front axle. Full floating rear axle.

SPRINGS. Chrome vanadium steel springs. Semi-elliptical front. Three-quarter elliptical rear. Rear springs under-slung. Dann oil-cushionized inserts in all springs. Resilient and squeakless.

TIRES AND RIMS. 36 by 4¼ inch tires. Non-skid rear tires. Firestone demountable rims.

BODY. The American Beauty, a creation of charm and comfort. Divided front seats without extra charge, if you prefer. Spacious doors. Finest of coach leather. Information upon request about roadster, coupe, limousine, seven-passenger and other bodies.

EQUIPMENT. Finest silk-mohair, one-man top. Jiffy curtains. Plate glass windshield, adjustable for rain vision and ventilation. Warner speedometer. Waltham clock. Klaxon horn. Motor-driven tire pump.

COLORS. Widest range of color schemes. Each buyer may have his car finished to suit his taste, thus avoiding the monotony of cars that lack individuality and distinction.

SERVICE. Winton Six owners receive cheerful and thorough service from the Winton Company without charge. The Winton Service System is without an equal.

WRITE TODAY FOR COMPLETE CATALOG

The Winton Motor Car Co., 424 Berea Road, Cleveland, Ohio



It is in the make-and-break mechanism that unquestionably the greatest simplicity in this new model is to be found.

The new make-and-break is of the spring type rather than the rocking lever type and is another exclusive patented Eisemann feature. Being of the spring type the parts are very light, so that no noise is produced in the opening and closing of the contacts.

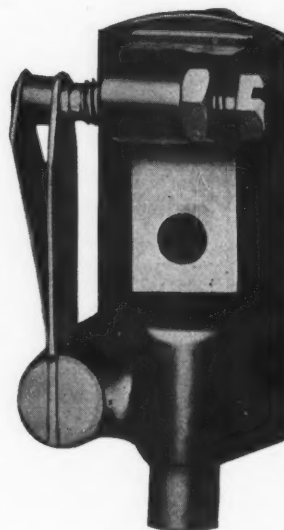
Because in its action of opening and closing the circuit the contact spring rides or glides over the round fibre cams with a sort of rolling motion, wearing of the contacts is substantially prevented—a condition which is emphasized in other types of make-and-break, where a hammering effect is produced in the opening and closing of the contacts. As in our other types of high tension magnetos this make-and-break mechanism is held in a fixed relation to the armature by means of the usual key and keyway.

New Type G-4 Make-and-Break Mechanism

The Eisemann Magneto Co.

Sales and General Offices
32-33d St., Brooklyn, N. Y.

New York Indianapolis, Ind. Detroit, Mich.
245 W. 55th St. 415-417 N. Capitol Ave. 802 Woodward Ave.



Make-and-break mechanism. Note the simplicity of the entire unit.

STANWELD RIMS

1915 Equipment on more than 500,000 Motor Cars

MORE than 150,000 American-made motor cars will be equipped with Stanweld Demountable Rims during 1915. More than 350,000 motor cars will be equipped with Stanweld Detachable and Plain Clincher Rims during 1915. A single pile of rims measuring more than 150 miles in height will be the output of this greatest of rim factories.

Stanweld Rims are made of the finest steel obtainable for the purpose. They are made by men who have made rims for a longer period of time than the employees of any other organization—men who make steel products, and steel products only. Stanweld Rims are inspected for strength, workmanship, and tire-fit. They are used as standard equipment on the following makes of cars:

*Overland, Chalmers, Hudson, Dodge, Reo, King, Moon,
KisselKar, Mitchell, Pilot, Peerless, Stearns^(Light Four), Franklin,
Empire, Pathfinder, Cunningham, Westcott, Lyons-
Knight, Lewis, Republic, Dorris, Maxwell,
Stanley, S.G.V., Spaulding, Crow, Simplex,
Austin, Baker, F.I.A.T., Detroit, Rauch
& Lang, Ohio, Herff-Brooks,
Mercer,
and others*



*Stanweld Number Twenty
Demountable Rim*

The Standard Welding Company

Main Offices and Factory: CLEVELAND

District Distributors in

| | | | |
|--------------|------------|---------------|--------------|
| New York | Toronto | Houston | Washington |
| Philadelphia | Nashville | Omaha | Dallas |
| Boston | Chicago | Montreal | Kansas City |
| Atlanta | St. Louis | Richmond | Rochester |
| Denver | Cincinnati | Detroit | Toledo |
| Memphis | Buffalo | San Francisco | Indianapolis |

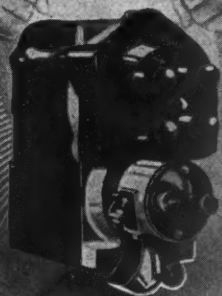
and 16 other large centers



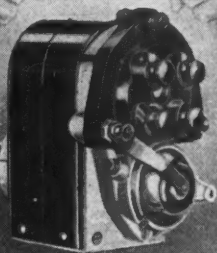
*Stanweld Number Sixty
Demountable Rim*

SPLITDORF

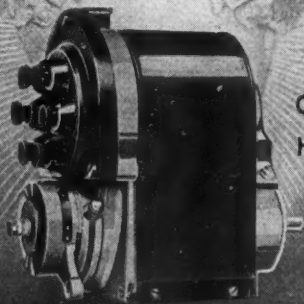
DIXIE
TYPE



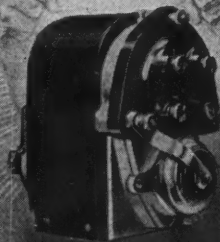
MODEL EU4
HIGH TENSION
MAGNETO



CUNNINGHAM
HIGH TENSION
MAGNETO



MODEL EU4-2
HIGH TENSION
MAGNETO



America's Challenge to the World

DIXIE

The Great
Automobile Contract--
Overland exclusive

Why a magneto?

Because it is the best ignition

Why a DIXIE?

Because it is the best magneto

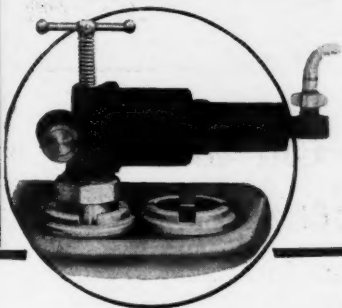
Why battery systems?

Because they are cheaper!

SPLITDORF ELECTRICAL CO.
NEWARK, NEW JERSEY

*(All SPLITDORF features are fully covered by
patent or patents pending)*

**Try One Free
On Your Car
For 30 Days**



If you want the very latest in a permanently attached tire pump, always ready for instant service—install a reliable

MAYO VALVE CAP PUMP

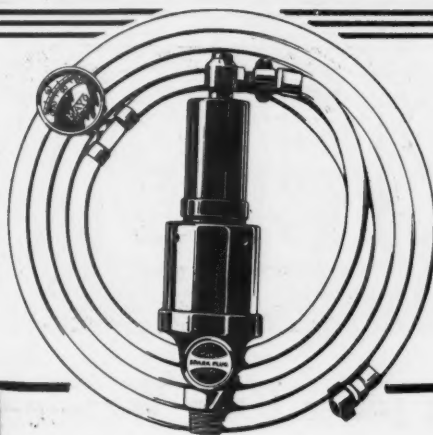
To operate: Without stopping the motor, simply press down the handle, give it a quarter turn and the pump starts working.

Readily installed into one of the valve caps on any 4-cycle motor.

All the unequalled advantages of the MAYO Spark Plug Pump principle plus the permanent attachment feature. No gears to grind and become noisy. Pumps a tire in 3 minutes instead of 10. Complete with 14 ft. hose, gauge, and all connections—

\$15

None of the disadvantages of gear pump installation and upkeep expense.



If you are touring to the coast this summer or are only driving to the next town—or about the boulevards—you need a

MAYO SPARK PLUG PUMP

—to take care of tire emergencies.

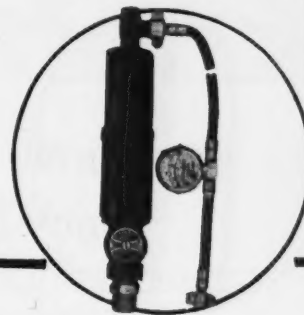
A flat tire, with a MAYO to do the pumping, is but a pleasant incident in the drive. Without a MAYO, it is a back-breaking, pleasure-spoiling job, that means pumping 80 lbs. pressure by hand.

The MAYO Spark Plug Pump is the oldest and best known power pump on the market. Pumps pure, fresh air only. Adapted to any car. Instantly substituted for any spark plug. Built with rings like your motor—and lasts as long. Complete, 12 ft. hose, gauge and all connections—

\$10

The MAYO is the lowest priced quality tire pump. Investigate.

**The Pioneer of all
Power Pumps
—World Famous**



Whether you are using your Ford for transcontinental touring this year—or simply touring about home—complete your equipment with a

MAYO FORD PUMP

It takes all the work out of tire pumping.

It gives your Ford the greatest convenience of highest priced cars, and it is a tire economy you can't afford to overlook.

The MAYO Ford Pump is made especially for Ford cars, and as perfectly as the largest MAYO. Attached and operated exactly like standard MAYO Spark Plug Pump.

Complete with 10 ft. hose, gauge and all connections—

\$8

The first quality Pump at a price consistent with Ford cost.

**You Will Need a
MAYO Pump on
that Tour to the
Coast this Summer**



Mayo Mfg. Co.

55 East 18th Street
Chicago, Illinois

**Write Us for Full
Information**

The New REO The Fifth \$1050

"The Incomparable Four"

Surely This Must Be a Wonderful Car to Enjoy Such a Demand at Such a Season!

OUR SCHEDULE OF DELIVERIES of Reo the Fifth—made in August in the usual course and anticipating the usual "dull season" of January and February—called for 300 cars of this model in January and 450 in February. With March, according to that schedule, would begin the big out-flow.

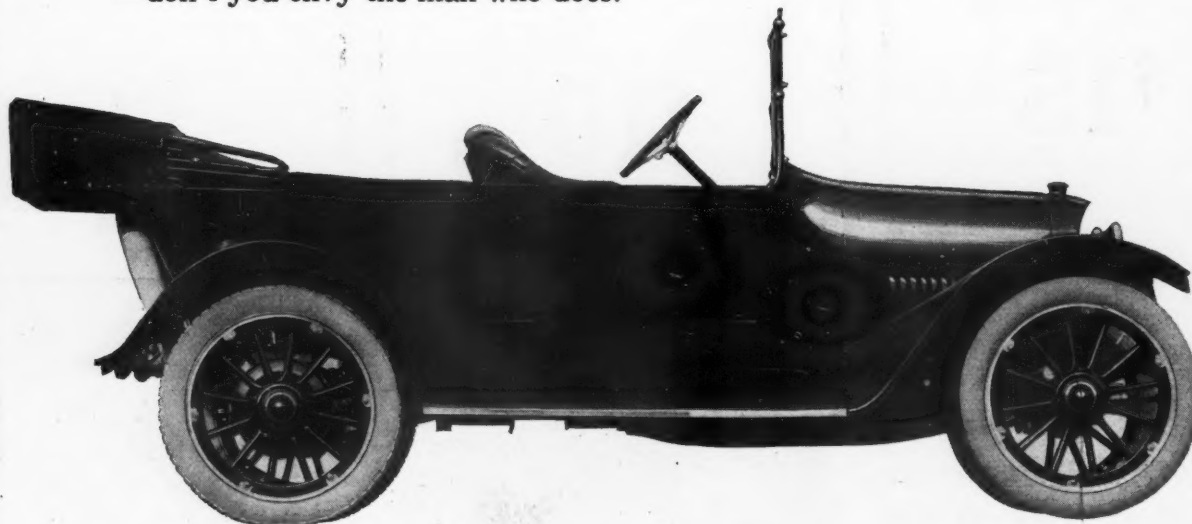
ALAS FOR WELL LAID PLANS! In January we shipped 1200 instead of 300, and in February, instead of 450, our dealers took 1800 Reo the Fifths—and begged for more.

MIND YOU, THAT was middle of winter—War Year! Just when everybody was trying to convince everybody else that we were enjoying hard times, the Reo plants were running a double shift in an effort to keep up with the demand for immediate shipments of automobiles.

WHEN WE TELL YOU that today, as this is written, we at the Reo factory are in just the same position that we were last May—tremendous demand in excess of possible output, and that despite the fact we are running double shift and turning out 100 cars per day—you will the more readily understand the remarkable condition.

CAN YOU IMAGINE any stronger testimony to the splendid qualities of a car than that unusual demand at that unusual season?

AREN'T YOU GLAD you hold the Reo franchise in your territory—or if you don't—don't you envy the man who does?



REO MOTOR CAR COMPANY, LANSING, MICH.
Reo Automobiles and Reo Motor Trucks

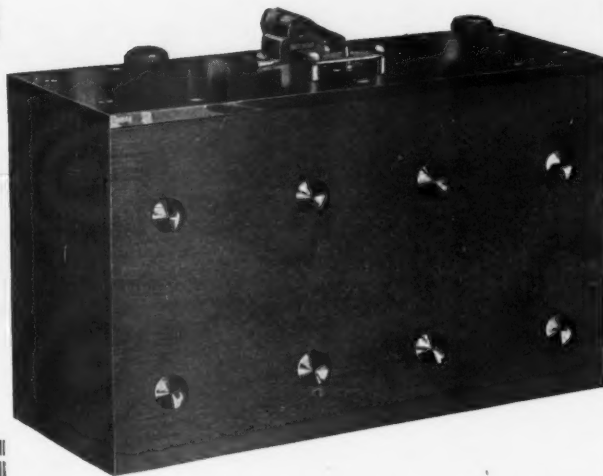
KINGSTON

Single Vibrator Coil for Ford 1914-15 Cars

"Put on the Kingston Single Vibrator Coil and Notice the Difference"

Only One
Vibrator
Adjustment

A Perfect
Even Spark
at Every
Plug



Why Use
Four
Vibrators
When One
Will Work
Far Better?

IT FITS in the metal coil box used on 1914 and 1915 Ford Cars. Just take out the four vibrating units slip in the KINGSTON Single Vibrator Coil and you are ready to go.

It will solve all Ford ignition problems. Easy starting. More Power. That continual adjusting of vibrators done away with. The spiral spring on the vibrator will not allow the contact points to stick.

The KINGSTON Single Vibrator Coil is also furnished in mahogany box complete with switch for older type Ford Cars.

THIRTY DAYS' FREE TRIAL. Write for particulars.

DEALERS—There will be a large demand for this coil. Write for our proposition by return mail.

Kokomo Electric Company, Kokomo, Ind.

New York Branch
1733 Broadway

Los Angeles Branch
334 W. Pico St.

Detroit Branch
650 Woodward Ave.

Chicago Branch
1430 Michigan Ave.

Largest Manufacturers of Spark Coils in the World

When the Salesman Says "Continental"

The name "Continental" has a calibre of 42 centimeters. It makes a dent both deep and lasting; and is the most irresistible piece of ordnance in the entire artillery of the up-to-date automobile salesman. It blasts away hesitancy, levels down opposition, scatters doubts, closes the argument finally and for keeps.



Continental Motors

The cars and trucks that are Continental-equipped are getting the business, because they are backed, not alone by the manufacturers' selling force, but by the tremendous prestige of "Continental"—a motor with a world-wide reputation.

They are backed by a power of universal goodwill—a trade-marked name—that is not excelled by any commodity, at any price, in any country under the sun.

Continental Motors are known to the buyers of motor cars and trucks as engines of splendid precision, made of the finest materials, machined to the closest possible limits, and inspected beyond even the remotest chance of flaw.

Better yet, they are known from what they have accomplished in the hands of a hundred fifty thousand owners.

They have the reputation. They are motors of character. Any man is proud to drive a Continental-powered car, or own a Continental-powered truck.

These are reasons why the single word "Continental" carries a weight of influence that swings tens of thousands of sales each year.

Back your cars and trucks with Continental prestige—it pays.

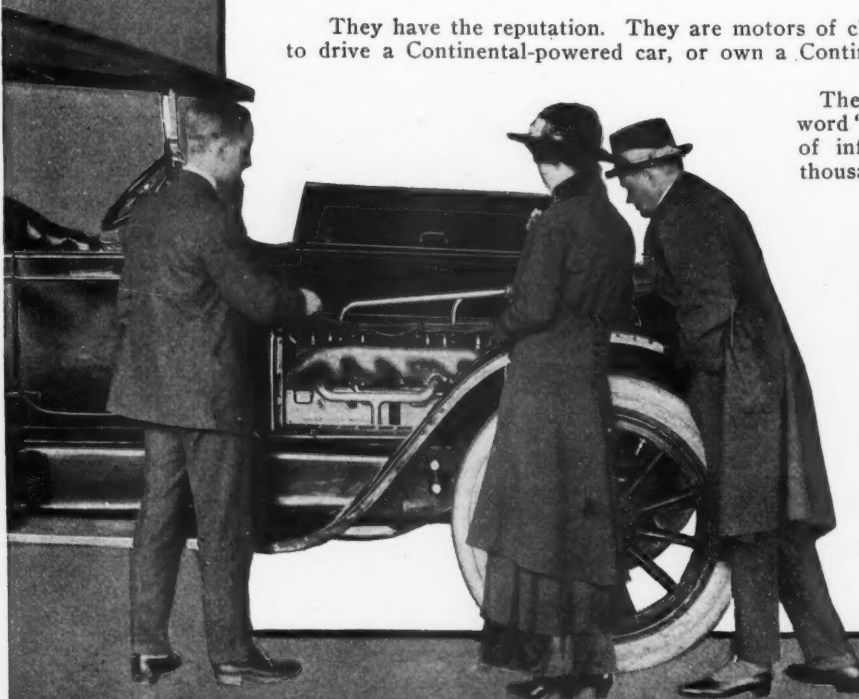
**Continental
Motor Mfg. Co.**

Largest exclusive motor
builders in the world

FACTORIES

Detroit

Muskegon



When Writing to Advertisers, Please Mention Motor Age.

RELIABILITY

The reliability of a great many good cars has been reduced materially by the inefficiency of the starting and lighting systems employed.

If you desire to obtain practically perfect Starting and Lighting efficiency with non-stalling engine efficiency, **without the whir-r-r-r** of noisy systems, then see that your car is equipped with the

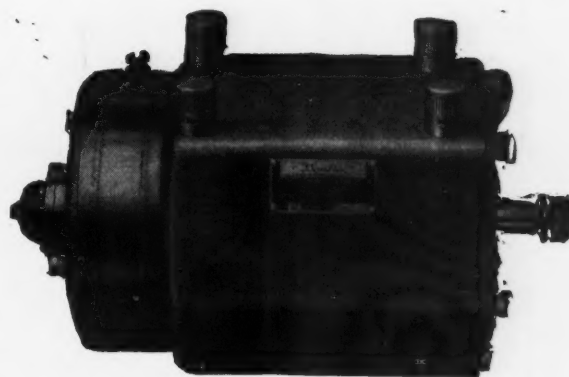
Single
Unit



Electric
Starting
and Lighting
System

"Never a Stalled Engine"

Ask Any Franklin
Dealer
or Owner



One Unit vs. Two Units

The Dyneto is a single unit. As a motor it has more starting power than the smaller motor in a two unit system; and as a generator more charging efficiency than the smaller generator in a two unit system.

One unit means less noise, less weight and no complications.

Write for Catalog and Full Particulars

DYNETO ELECTRIC COMPANY, Syracuse, N.Y.

SPECIALISTS IN STARTING AND LIGHTING EQUIPMENT

RAYFIELD

CARBURETORS

Rayfield Equipment Makes Quality Cars

Do you know that when a manufacturer puts a Rayfield on his car it means that the Rayfield is especially fitted to the motor, after thorough tests?

It means that that car has the most perfect carburetion human skill can provide.

It means that the owner is assured of *unequalled* economy, acceleration, speed, power and low throttling.

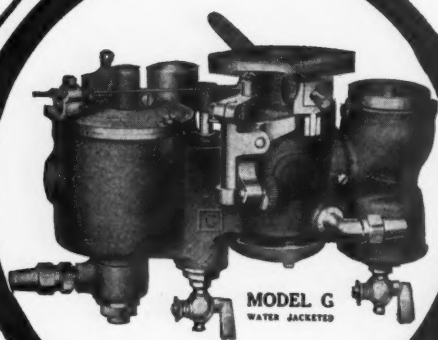
And it means also that the manufacturer preferred to pay the higher price for the Rayfield, rather than permit his car to be equipped with a less efficient carburetor because it could be bought for less money.

Models for all cars

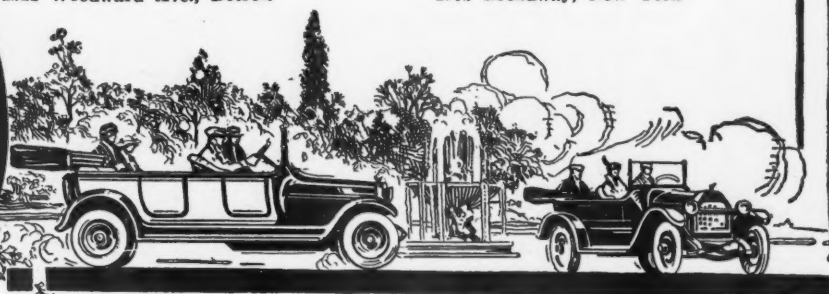
You can get one for your car from your dealer or direct from us. Rayfield service stations are established in all leading cities and towns.

Findeisen & Kropf Mfg. Company
2104 Rockwell Street, Chicago, Illinois

Branches: 1140 Michigan Ave., Chicago
1211 Woodward Ave., Detroit 1902 Broadway, New York



MODEL G
WATER JACKETED



When Writing to Advertisers, Please Mention Motor Age.

Moline-Knight "40"-\$1475

*Compare these Specifications
with any car in its price class*

Specifications

Light weight—under 3,000
lbs. ready for the road.

118 in. wheelbase.

Knight sleeve valve motor.

Guaranteed 40 h. p.

34x4 tires—non-skid rear.

Power pump.

Five passenger.

Selective, three speed
transmission.

High tension ignition.

Left hand drive.

Center Control.

Electrically lighted and
started.

Screw and nut steering
gear.

V shaped radiator.

Thermo-syphon cooling.

Unusually deep, hot riv-
eted pressed steel frame.

Full floating, spiral bevel
gear rear axle.

Force feed lubrication.

\$1475, F. O. B. Factory.

Write for detailed speci-
fications.

After you have compared the specifica-
tions with those of any car selling within
\$100 of its price, add the superiority of
the sleeve valve motor and you will agree
that the new Moline-Knight "40" at \$1475
represents *big value*.

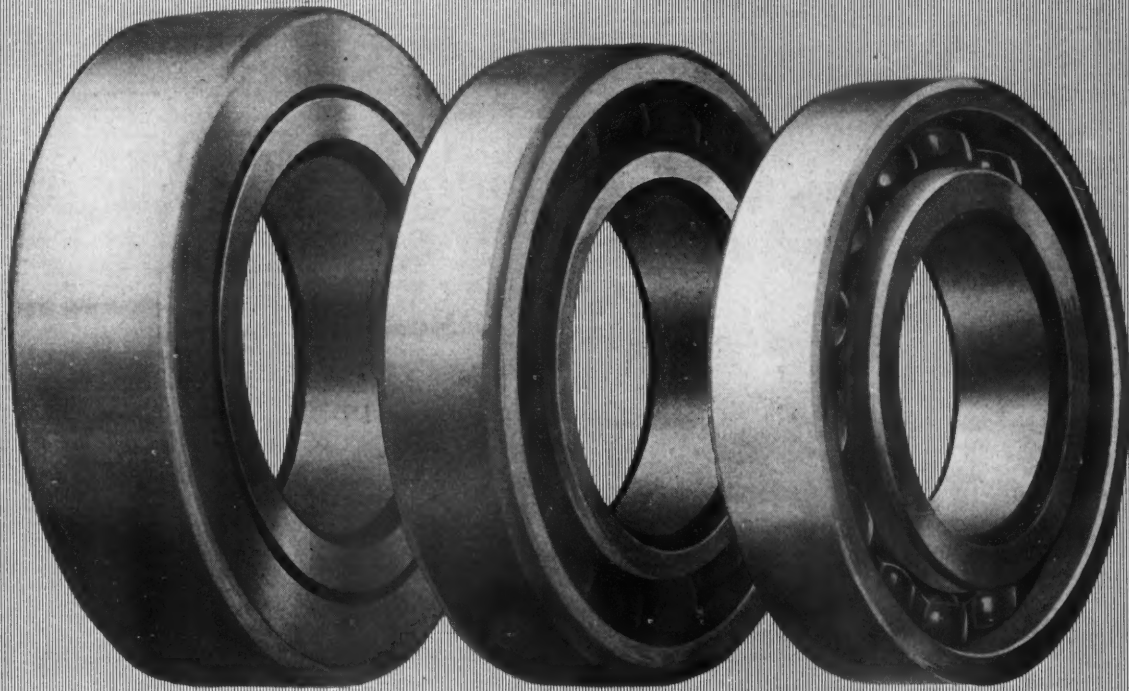
Here is a guaranteed 40 h. p. Knight
motor with 30 per cent more power per
piston displacement, 34x4 inch tires, 118
inch wheelbase, five passenger, left drive,
center control, weight less than 3,000
pounds when filled with gas and oil, and
other "best by test" details.

Write or wire for complete information,
including 40 h. p. touring car at \$1475
and 50 h. p. roadster, touring, sedan and
limousine models from \$2500 to \$3800.

\$1475
F. O. B.
Factory

Moline Automobile Company
East Moline, Ill., U. S. A.





NEW DEPARTURE BALL BEARINGS

American Made for American Trade

The leadership of New Departure Ball Bearings is based upon their own worth, upon their ability to stand up to the work they are designed to do, and upon the expert and whole-souled service that is bestowed by the manufacturer upon the original purchaser and the ultimate user of them.



**The New Departure
Manufacturing Company**
Bristol, Connecticut, U. S. A.

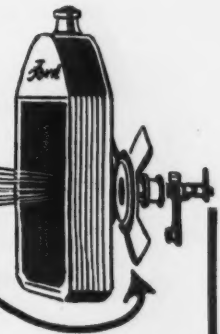
Distributors in Trade Centers
throughout the United States

Western Branch: 1016-17 Ford Bldg., Detroit, Mich.



OAKES *Beartone*

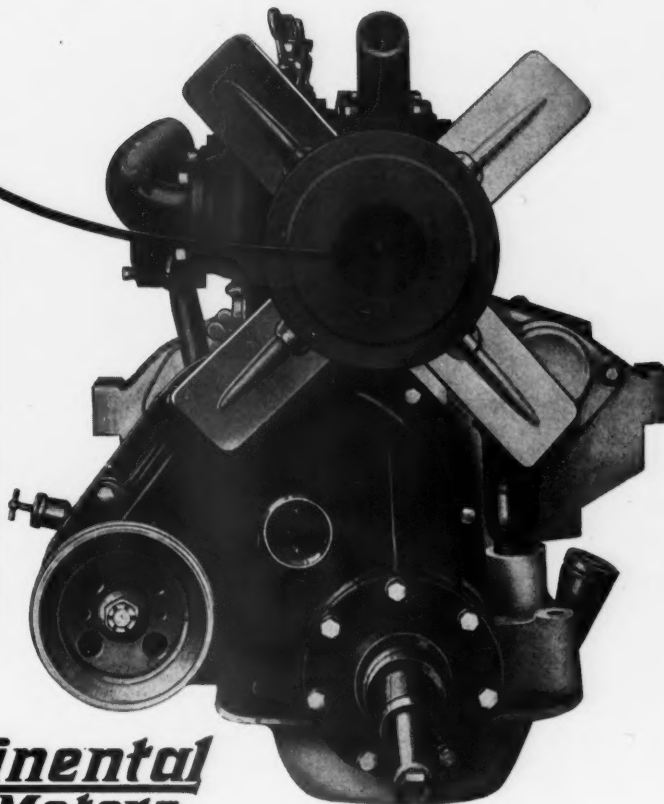
Sounds Thru Radiator



HORN and FAN Combined

Not an Electric Horn

The Beartone has the same mechanical operation as high grade motor-driven horns, but with no current consumption, at low first cost and without any complicated mechanism to get out of order and give trouble.



**Continental
Motors**

Easy to Attach

The Beartone can be interchanged with the fan on your Ford car by any one in a jiffy. Once you get this Oakes fan on your Ford, it will never need to be replaced. The Oakes fan is a unit with the Beartone horn. It adds to your motor's efficiency—keeps radiator always cool.

The Beartone never fails to sound—touch the button at driver's seat and you always get a response. Not an electrical horn—has no motors, gears, batteries or wires to get out of order. No battery expense. No complicated mechanism. It is in the logical position, under the hood and in front of the motor, and not at the side where the fan pressure would decrease the volume. It is the safest of horns.

\$7

YOU can safely follow the example of these experts—the critical engineers responsible for the quality of Continental Motors. Their recognition of the superiority of the Oakes Fan is one of the many evidences of Oakes quality.

The Oakes Beartone horn-and-fan combined as exhibited at the Chicago Auto Show on the Continental Motor.

Ask yourself this question—"Would Continental vouch for this Beartone if it was not of absolutely proven merit?" Beartone has the unqualified endorsement of the Continental experts. These experts use Oakes fans as standard equipment on 128 different cars and trucks that use their motors. You get the Oakes fan with your Beartone horn—they are one unit.

Lucrative Dealers' Proposition—Write to

THE OAKES COMPANY, Indianapolis



Canadian Branch:
BEARTONE MFG. CO., Berlin, Ontario

**FOR ...
FORDS
BUICKS
MAXWELLS
and other cars**

\$20 to \$50



Eureka

Electric Lighting Outfits generate a great white, far-carrying light that insures the utmost in safety. At moderate cost they put any small car in the high-priced class.

Eureka Electric Lighting Outfits

Installed Easy as A B C

Outfit is self-contained and needs no adjustment. BALL BEARINGS THROUGHOUT. Comes ready to put right on your car. Generates more current at less expense than any other similar device. Has 16 years' experience built into it. Write for full information.

Permanent Satisfaction Guaranteed

DEALERS: Nearly 1,000,000 cars need this system. No limit to sales. Write for attractive proposition.

HENRICKS MAGNETO & ELECTRIC COMPANY
(FORMERLY HENRICKS NOVELTY CO.)
1523 St. Paul Street INDIANAPOLIS, INDIANA
EASTERN OFFICE: 136 Liberty St., New York



EUREKA
Electric
"Lighting
Outfits"

"Exactly What You Wanted To Know, Told So You Can Understand It"

A Valuable Book for Owners, Repairmen, Drivers, Students and Salesmen

FIVE BOOKS IN ONE COVER
—512 Pages—217 Illustrations. Drawings, Diagrams and Charts

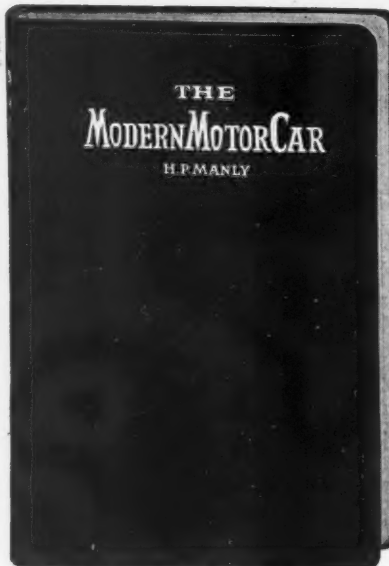
I

PARTS OF THE CAR—Their Construction, Use, Care and Repair.

Contains simple rules for performing every mechanical operation the car can ever need. Not only covers the newest developments, such as eight-cylinder engines, vacuum fuel feed, etc., but contemplated improvements from the makers of cars and parts.

II

MATERIALS AND SUPPLIES—How to Use, Buy or Make Everything Needed in Running the Car.



III

ELECTRICITY—Its Underlying Principles Interestingly Explained.

IV

ELECTRIC LIGHTING, ENGINE STARTING AND CONTROL—First Complete Explanation. Covers such things as electric gear shift, electric brake, Edison storage battery, new magnetos and new time saving methods of wiring.

V

IGNITION PARTS — Design, Construction, Care and Repair of Every Standard Form of Ignition Appliance as Well as Newest Adaptations.

INDEX

24 PAGES—Listing 1165 Headings Under Every Possible Classification.

"The Modern Motor Car"

A complete book on upkeep and repair.

A money saver for every man interested in motor cars.

Brand new from cover to cover. Contains no history, out-of-date or obsolete matter. Written in non-technical language.

Bound in Black Morocco with Flexible covers, Gold Lettering and Polished Edges the MODERN MOTOR CAR sells for only **\$2.50**

THE CLASS JOURNAL COMPANY

900 MICHIGAN AVENUE, CHICAGO, ILLINOIS

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It Sets the Pace

Oldsmobile

Established 1880 Incorporated 1899
OLDS MOTOR WORKS
LANSING - MICHIGAN

Scripps-Booth

luxurious light

Cars

represent the highest possible motor car quality and comfort in minimum weight construction

Roadster - - \$775

Coupe - - - \$1450



Social Advantage

One buys a painting for its charm and art value, not its paint and canvas.

One buys a book for its entertaining value and literary merit, not its paper and ink.

One buys a house for value beyond that of mere contained space to live in, and demands luxury, convenience and beauty.

The modern motor car is bought for more than machinery, and for more than iron and steel. Milady demands refinement, dignity and social advantage in her car, together with the most up-to-the-minute appointments and performance. The art of the master is demanded in the lines of modern motor cars. Scripps-Booth cars are masterpieces of art and mechanism, and are the only light cars with a social standing. For city or touring, for opera or shopping, for Fifth avenue or Newport the name Scripps-Booth expresses the limit of luxurious motor car building.

SCRIPPS-BOOTH CO., Detroit, Mich.

It PLUGS the hole and It HUGS the hole

Send for The New Rubber

SAMPSON REPAIR PLUG

For Automobile Inner Tubes. Instantly Cures the Puncture and Leaves No "Lump"

Eliminates the Carrying of Several Extra Tubes and Cuts Down the Cost of Repair to a Minimum. No Cumbersome Tools or Heating Irons Necessary—Only One Small Tool and Your Bare Hands.

The Big Tire Feature of 1915

Aroused great interest at the New York and Chicago Automobile Shows—a pliable rubber plug with a metal core—feathers out at the edge and becomes an integral part of the tube. Not an experiment of a novice but the tested invention of a tire expert. Tested in tubes for upwards of 7,000 miles and never found wanting. Good for 30,000 miles if the tube is.

No Cement No Cleaning No Waiting

An instant roadside repair as permanent as vulcanizing. Utilizes the same principle used in fastening the valve stem in the tube—and positively cannot bite or chafe. Dealers—Inquire for it of your Jobbers; or write us for information.

STEVENS & COMPANY
375 Broadway New York

PRICES:—Sampson Repair Kit, Containing 1 Tool and 1 Doz. Assorted Plugs, \$2.50. No. 2 Sampson Repair Carton, Containing 1 Tool and ½ Doz. Assorted Plugs, \$1.50. Sampson Repair Plugs, per Doz., \$1.75. Sampson Repair Tool, 50 cents.

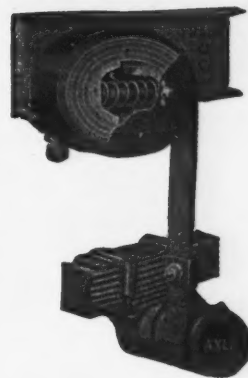
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Straight Talk About Springs and Riding Comfort

¶ No manufacturer can design a spring for all loads and speeds. Even the most flexible springs now in general use are designed to give full riding comfort at only certain loads and speeds.

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¶ Snubbers are the one device that controls excessive spring action and ensures practically the same easy riding under varying conditions of road, load and speed.



WRITE US FOR FULL INFORMATION

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GABRIEL SNUBBERS

Cornelian Light Car

BLOOD BROS. MACHINE CO., ALLEGAN, MICH.

\$410

Top and Windshield \$25 Extra



Speed, Comfort, Durability, and ease of control put the CORNELIAN in "a class by itself." The long standing, envious reputation of its makers puts the owner in "a class by himself." There's a great scramble for desirable territory on this car, because its future is fully assured **Blood Bros. Machine Co., Allegan, Mich.**

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Remarkable Increase in Car Efficiency and 35% Gasoline Saving



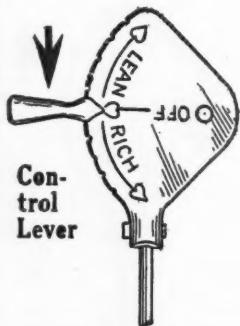
**FOUR
ECONOMIES**

**REGULATOR
ECONOMIZER
PRIMER
EXTRA AIR**

\$10

Complete

Press down the control lever from central position to enrich the gas. Pull it up from center to get thin mixture. Every variation of weather is met and mastered. Insures maximum motor efficiency **DURING ALL SEASONS.** Obviates the annoyance of carburetor adjustments, and your motor is always ready to start. If your dealer cannot supply the "Primer and Mixture Regulator" we will send direct upon receipt of order. Complete, ready to install, \$10. Prepaid.



We want every man in the trade to send for our literature and discount to dealers.

**The Primer and Mixture
Regulator Co.**

114-120 W. 30th St. New York

National

**Six
\$2375**

THE SIGN OF SUCCESS!
This Radiator Is the Mark of Quality



On the Road to Success!

The National Dealer has the right-of-way for Spring sales. The appearance, comfort, convenience and performance of his car gives him the entrée ahead of others. Nothing is omitted. Every need is taken care of in excess of actual demands. Seven distinct and new styles.

National Motor Vehicle Co.

INDIANAPOLIS

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SIDE VIEW OF TENT ERECTED

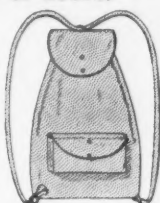
Compac Auto Tent

Is the Tourists Ideal Hotel

IT will cut down expense in touring to the coast—or on shorter trips. Lasts for years.

The COMPAC Auto Tent—that folds, and is conveniently carried anywhere on the running board or under rear seat—allows the healthful practice of sleeping out-of-doors.

Large and roomy, with partition, if desired. Water-proof, snake-proof, insect-proof. Easy to erect. Folds to 7x20 in. Price \$18.00. Other grades, \$24.00 to \$48.30. Write for details.



Compac Ruck Sack

For carrying supplies on sight-seeing detours made from the car on foot. Absolutely water-proof. Slips over shoulders. A necessity on any tour. A convenience worth many times the price, \$2.

Compac Duffle Bag



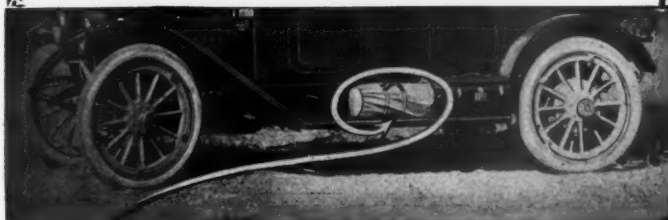
Necessary on any tour. Essential for carrying provisions and camp supplies, clothing, etc. More compact and handy than boxes or suitcases. Made in 4 sizes. Prices, \$1 to \$2.

Dealers:—These COMPAC articles—and many others—are in line for a big run. Some of the profits should be yours. Good discounts. Write today.

COMPAC TENT COMPANY, Inc.

414 W. Tenth St., Indianapolis, Ind.

Distributors: New York Sporting Goods Co., 15 & 17 Warren St., New York City; Simmons Hardware Co., St. Louis, Mo.



TRINITY BELL

“Warns Both Ear and Eye”



The red light surmounting the bell flashes a warning the instant signal is sounded.

Made in 3 sizes.

Model A—3½ in. diameter—for small cars. Price complete, \$6.

Model B—5 in. diameter—our leader—for large cars. Price complete, \$10.

Model C—6 in. diameter—de luxe equipment for limousines, heavy touring cars and trucks, \$12.

Ideal for Touring

For that tour to the coast this summer—or on any tour for that matter—you need a Trinity Bell. Its musically vibrant warning carries clean cut and clear, around the numerous bends encountered on mountain passes—up over hills—and far down narrow, winding roads, where not to warn other cars of your approach spells danger.

Bells are Used as Warning Signals the World Over

No warning device gets more instant attention or more certain action than a bell. Bells are universally used as warning signals by fire trucks, electric cars, locomotives, ships, as factory fire alarms, etc. Bells cut through all competing sounds on the principle that a musical tone carries farther than a noise.

The Trinity Bell is instantly operated by pressure of hand or foot on electric push button. Trouble-proof. Requires least current. Contact points of pure platinum.

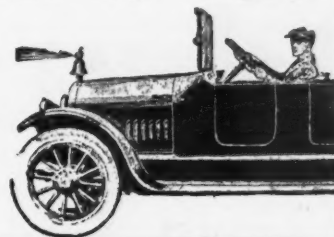
Dealers and Jobbers

Get this money-maker now. Write for our liberal proposition and original selling plan.

Trinity Bell Electric Mfg. Company

5108 Calumet Ave.,
CHICAGO

Branch Offices: Trinity Bell Sales Co., 11 N. Cascade Ave., Colorado Springs, Colo.; 2028 Farnam St., Omaha, Neb.; 519 Downing Bldg., Erie, Pa.; 712 Ford Bldg., Detroit, Mich.



\$15
Per Set

The RIGHT Shock Absorber at the RIGHT Price

For Cars from 1800 to 3500 lbs.

Highest in efficiency—lowest in cost.

Absorbs the light and heavy shocks and also reduces the vicious recoil to pleasant and useful spring action.

A saving on car and tires—a gain in comfort and pleasure.

Made and sold to give absolute satisfaction.

If your dealer does not handle the Right Shock Absorber, write us direct.

**Guaranteed
for Life**

Mr. Dealer: You cannot afford to be without this necessity. Ask us why.

MANUFACTURED BY

RIGHT MOTOR SPECIALTY CO.
1324 Michigan Avenue Chicago, Ill.

FREE!

Motorists, send and get your
copy of our tire book—
"Care and Repair of Tires"

It is a guide and text book that will post you thoroughly. It tells the proper inflation according to weight, load and season. It describes fully how to protect the tires while car is idle in the garage—how to care for them in winter—how to avoid substances that rot the rubber and fabric. It gives splendid hints on the spare tire and its care—how to carry extra tubes. It explains the tire sleeve, the blow-out patch—repair plasters and plugs and emergency or temporary repairs. This book is quoted as an authority by American and Foreign Automobile publications, because of the authentic information it contains. It also explains the value of

SHALER Vulcanizers

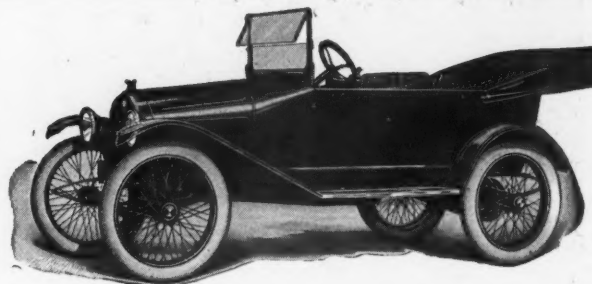
and how they save tires and repair bills. Shaler Vulcanizers will repair puncture, blow out, rip, cut, hole or tear in casing or tube perfectly and permanently and make the repair the strongest part of the tire.

Shaler Vulcanizers are made in every type—Electric, Steam, Gasoline and Alcohol. Shaler Tube-kit \$2.00; Shaler Vul-kit, (gasoline) at \$3.50; Model D (operates from electric light socket), \$12.50; Model S (steam) \$12.50. Complete Garage Outfit (electric or steam), \$60.

Write for Your Copy of This FREE Book

It's free to any motorist. No obligations. Just write and we will send it to you without cost. Every motorist should read it and post himself about his tires—how to care for them and reduce his tire expense. It's free. Send for your copy.

C. A. SHALER CO. 208 Fourth St., Waupun, Wis.



METZ '25'

The Quality Car

THE man who is looking for a strictly first class car with complete, up-to-date equipment, knows he has found what he wants when you show him this new Metz Touring Model, and tell him the price—

\$600

**Including Electric Starter and Electric
Lights as Regular Equipment**

Gray & Davis system, rain-vision, built-in windshield, instant one-man top, heavy tufted upholstery, deep cushions, 32-in. wheels, 3½-in. Goodrich clincher tires, Bosch magneto, Hyatt roller bearings, built-in gasoline gauge, speedometer, signal horn, tools, etc.

*We want to hear from Dealers
Write for particulars and New Catalog "K"*

METZ COMPANY, WALTHAM, MASS.

THE
Kemco

Two-Unit

**ELECTRIC STARTING-LIGHTING
SYSTEM**

Can be attached to practically
all cars in service

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DEALERS

THE KEMCO

Has *proved* its quality.

Contract with dealers is attractive.

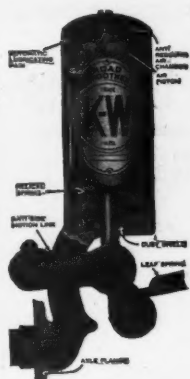
Company gives dealer a good profit.

Sales mean service satisfaction.

Unoccupied territory now being allotted.

Write for Booklet No. 17
Prices and Discounts

**The Kemco Elec. Mfg. Co. 2233 Ashland Rd.
Cleveland, O.**



\$15 Set of Four
One for
Each Wheel

Taking up the Shock Checking Rebound Preventing Side-motion

are the three essential features necessary to give you greatest comfort over all kinds of roads.

You get these only in



**Road
Smoother**
Reg. U. S. Pat. Off.

Quickly Applied to Your Ford Car

K-W Road Smoothers will enable you to get big car comfort from your light, economical Ford. They are designed right, built right, and of such materials that enables us to give them the K-W guarantee. Over 125,000 users of K-W Master Vibrators know what that means.

"Taking Out the Bumps" is the title of a booklet that tells you all about K-W Road Smoothers, which are sold by dealers who know the difference, everywhere. If you don't know your dealer, it will pay you to write for this booklet at once.

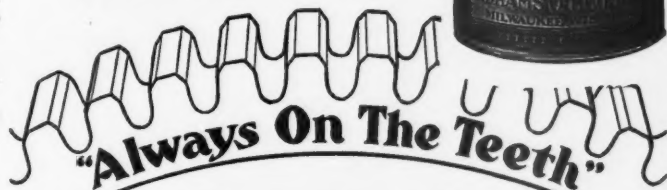
**HEADLIGHTING
OUTFITS**

THE K-W IGNITION CO.
2835 CLEVELAND, OHIO, U.S.A.

**SPARK COILS
SPARK PLUGS**

BADGER Gear Compound

will give more real satisfaction—in lubrication and prevention of wear on gears—than you ever thought possible. It will—simply because it's made different.



Never Runs Thin

Stays where you put it, right square on the gear teeth. Will not pack the sides of the gear case. Every ounce lubricates. Makes your engine deliver its utmost efficiency, all the time.

STOPS NOISE—LESSENS WEAR

Stops the noise and makes transmissions keep quiet—something that will do more than any other one thing to keep your car from getting old before its time. No car owner can afford not to give Badger Gear Compound a trial. We also make the popular F. V. Motor Oil and the Badger Lubricants. See your dealer or write us.

Dealers, Write for Territory

Wadhams Oil Co., Milwaukee, Wis.

Coast Distributor: Wadhams Oil Company of Washington, Seattle, Wash., and Vancouver, B. C.



**BEAUTIFUL
POLISH
FOR 10¢**

JOHNSON'S PREPARED WAX

*"Makes Old Cars
New Motor Stars"*

An application of Johnson's Prepared Wax to the body, hood and fenders of automobiles, electrics and limousines, whether old or new, is a good investment of time. It preserves the varnish and protects it from the weather—it covers up small scratches and minimizes the labor of keeping cars in good condition. Mud spots can be easily and entirely removed from cars which have been polished with Johnson's Prepared Wax. One of its greatest advantages is the fact that it

Does Not Gather Dust

Johnson's Prepared Wax is universally used for polishing floors, linoleum, woodwork, furniture, pianos, etc. It has just recently come into prominence as an automobile body polish and is giving unqualified satisfaction everywhere for this purpose. The Wax imparts a perfectly hard, dry, high gloss which holds its lustre indefinitely—is clean and easy to use—and

"Sheds Water Like a Duck's Back"

Where the varnish has become rough, a perfectly smooth, new body can be built up with Johnson's Prepared Wax. Apply several coats, polishing each well and allowing a half-hour interval between coats. In many cases, this will save the expense of having cars revarnished.



Send us the attached coupon together with 10c in coin or stamps and we will forward you postpaid a Universal size can of Johnson's Prepared Wax, which is sufficient for one application on a large car.

I enclose 10c for a Universal Size can of Johnson's Prepared Wax—sufficient for one coat on a large car.

Name

Address

City and State

Fill out this coupon and mail to

**S. C. JOHNSON & SON
RACINE, WIS.**

MA3



RAJAH

at San Diego

Of the 19 cars in the race 13 were equipped with Rajah Plugs, including the Maxwell and the Duesenberg, which took 2nd and 3rd places respectively. The world's non-stop record was made by Carlson in the Maxwell, who used Rajah Plugs.

Rajah Plugs are preferred by practically every race driver of experience.

Rajah Giant Plug, \$1.50 postpaid

Rajah Auto Supply Co., Bloomfield, N. J.

John Millen & Son, Limited—
Montreal, Toronto, Vancouver, Winnipeg

FEDDERS RADIATORS



Fedderson Manufacturing Co., Inc.

Buffalo - - - N. Y.

Lexington

CRITERION OF ITS CLASS

Thoroughbred Six—\$1875 Famous Four—\$1375
Six Supreme—\$2575

All equipped with the Moore Multiple Exhaust

Write for Details and Co-operative
Dealer Proposition

The Lexington-Howard Co. Eighteenth Street West
Connersville, Ind., U. S. A.

Guaranteed for 10,000 Miles Bricton Pneumatic Tires

We now sell Bricton Pneumatic Tires on a specific guarantee of 10,000 miles service. Bricton Pneumatic Tires are Puncture-proof, Blowout-proof, Skid-proof, Rut-proof, Rim-cut-proof, Oil-proof and Gasoline-proof. A tire with wonderful resiliency and easy riding qualities.

FREE TRIAL OFFER—To remove any possible doubt concerning the merits of Bricton Tires and to back up our statements fully, we have a FREE TRIAL offer at our own risk. The only tire made that offers a FREE TRIAL—you can't go wrong. You risk nothing. We take all the risk. Be sure and ask for our FREE TRIAL plan when you write for particulars.

Have Your Present Tires Rebuilt the BRICTON WAY—If you are not in need of new tires and the fabric in your tires is still good, we can rebuild them the Bricton Way, give you thousands of miles additional service and make them Puncture-proof, Blowout-proof, Skid-proof, Rut-proof, Rim cut-proof, Oil-proof and Gasoline-proof.

Write today for full particulars including details of FREE TRIAL PLAN.

THE BRICTON MFG. CO.
1225 Bricton Bldg., Brookings, S. Dak.



A
10,000
Mile
Written
Guarantee
with every
Bricton
Tire assures
you of Tire
Economy
you have
never
known
before

Model Motors

Built for Automobiles

In the Following Sizes:

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|---------------|-----|---------------|-----|
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PITTSBURGH MODEL ENGINE CO.

Lexington St. and Penna. R. R. Pittsburgh, Pa.

FACTORIES—Peru, Ind.; Pittsburgh, Pa.



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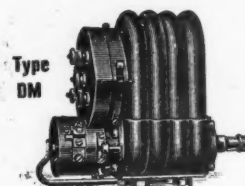
It contains descriptions of all the famous Campbell Motor Car Accessories; Detachable Upholstery Percama, Johnson Model "D" carburetor, Straps, Boots, etc., etc.

Territory open for reliable established dealers

The Perkins-Campbell Co.

624 Broadway

CINCINNATI, O.



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HEINZE MAGNETOS have proven superior in all competitive tests. This superiority is your guarantee of FREEDOM from ignition troubles.

HEINZE ELECTRIC CO.

Sales Offices: Detroit, Michigan

Factories: Lowell, Mass.

Service Stations—New York, Detroit, Chicago, Minneapolis



Link your motor to the **BIG BOY**—a big plug for big deeds. Guaranteed forever, because it's a—



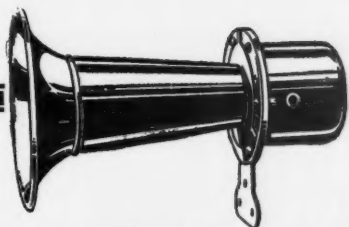
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| BIG BOY.....\$1.00 | Combination.....\$1.25 |
| Regular......75 | Platinum Point.....1.50 |
| Priming.....1.25 | All Sizes—All Dealers |

EMIL GROSSMAN MFG. CO., Inc.

Bush Terminal

Model Factory No. 20, Brooklyn (New York City)
Chicago: 2615 Michigan Ave.

When Writing to Advertisers, Please Mention Motor Age.



Lowest Priced Electric Horn Obtainable

REXO II

\$3.85—Ready to Attach

Guaranteed for the Life of Your Car

THE GARFORD MFG. CO., 2503 Olive Street Elyria, Ohio, U. S. A.



Hyatt Quiet Bearings

HYATT SERVICE STATIONS

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Boston, Mass. Los Angeles, Cal.
Chicago, Ill. New York,
(Harrison, N. J.)

Hyatt Quiet Bearings are used in the majority of American made Automobiles

SERVICE AGENTS
High Wycombe, England
Broom & Wade

HYATT ROLLER BEARING CO.
DETROIT, CHICAGO
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ZENITH
CARBURETOR

For seven years the
unchanging standard
of quality motor
vehicles

Detroit
U.S.A.

Complete
System
\$50.00



Complete
System
\$50.00

ELECTRIC LIGHTING SYSTEM

Dealers, write

XCEL-O-LYTE COMPANY (Formerly Best-Lite)
NEWTON, IOWA

Twitchell

Air Gauge

The New Positive Lock Stop

feature renders absolutely impossible the registration of any but the exact pressure in your tires.

Don't Guess

Tires inflated to forty pounds look and feel exactly like tires containing eighty. The only way to tell the exact air pressure in your tires is by means of a TWITCHELL gauge.

Price One Dollar
For Sale by Jobbers, Dealers and Garages, or

THE TWITCHELL GAUGE CO.
1201 MICHIGAN AVE., CHICAGO

The **AERMORE**
Exhaust Horn

Polite Yet Effective

Can be heard a block or a mile. It pleases the ear whether blown low or loud. Just the horn you want. Here are the reasons:

Musical Sound—Built on the principle of a pipe organ. Four notes, blown at once, produce perfect harmony.

No Upkeep—First cost is only cost. Made of brass tubes, nickel-plated. Nothing to wear out.

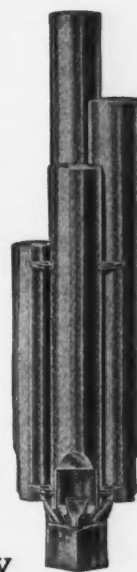
Reliable—Cannot clog. Cannot be tampered with when car is standing.

Clears the Way—Amplify warns but does not frighten.

Easy to Put On—Nothing shows but the foot pedal.

Get it from almost any dealer. Price \$5.50 to \$7.50 complete. Every horn guaranteed. Sold direct where local dealer does not carry it. Descriptive folder sent on request.

The Fulton Company
727-729 National Ave., Milwaukee, Wis.



For best results use
SEARCHLIGHT

Acetylene Service for Oxy-Acetylene Welding and Cutting.

The purest and dryest form of compressed acetylene, delivered to you in steel cylinders.

Open the valve and gas is ready.

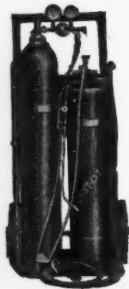
Let us solve your acetylene problems.

WRITE FOR COMPLETE INFORMATION TO

THE SEARCHLIGHT COMPANY
1016 Karpen Building, Chicago, Ill.

Prest-O-Lite

(Ready-made Carbide Gas)



For Oxy-Acetylene Welding and Cutting

A big source of profit to garages. Makes enormous savings in repair work. We furnish a thoroughly high grade welding apparatus for \$60. The average user will also need gas cylinders, furnished at additional cost, and a small assortment of welding supplies. Truck at extra cost when desired. Write for details.

THE PREST-O-LITE COMPANY, Inc.
The world's largest makers of dissolved acetylene.
233 Speedway, Indianapolis, Ind.

The Improvement in RADIATORS
NATIONAL CAN COMPANY, Detroit, Mich.
1242

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TRADE MARK
EST. U.S. PAT. OFF.
THE PRODUCT OF BRAKE SPECIALISTS
USED FOR
BRAKE LINING - CLUTCH FACING
Manufactured by
THE ROYAL EQUIPMENT COMPANY
Bridgeport Conn.

BRAENDER

TIRES and TUBES

are famous for their **QUALITY**

We wish to announce that irrespective of action by any other organization, Braender Quality Will Be Maintained

Braender Net Prices to Car Owners

| Tires. | Plain. | Non-Skid. | Gray Tube. | Red Tube. |
|------------|--------|-----------|------------|-----------|
| 30 x 3 | 9.00 | 10.85 | 2.35 | 2.60 |
| 30 x 3 1/2 | 11.60 | 13.35 | 2.70 | 3.00 |
| 36 x 4 1/2 | 27.35 | 31.45 | 5.20 | 5.80 |
| 37 x 5 | 32.80 | 37.15 | 6.30 | 7.00 |

BRAENDER RUBBER & TIRE CO.
Main Office & Factory, RUTHERFORD, N. J.
New York, 250 West 54th Street
Agents in principal cities

Established Agents Solicited

Electric Auto-Lite Starting-Lighting-Ignition

Electric Auto-Lite equipment for automobiles is as famous for the service that backs it as for the reliability and economy of its operation.

ELECTRIC AUTO-LITE COMPANY

Home Office and Factory: Toledo, Ohio
New York Detroit Kansas City San Francisco

MARMON

"The Easiest Riding Car In The World"

"41"

\$3250

152" Wheelbase

"48"

\$5000

145" Wheelbase

Nordyke & Marmon Company
Indianapolis (Established 1851) Indiana
"Over Sixty Years of Successful Manufacturing"

GAS, GASOLINE and OIL ENGINES


Including Gas Producer Plants

By
GARDNER D. HISCOX, M. E.

A complete American book on this subject for Gas Engine Owners, Gas Engineers, and intending purchasers of gas engines, treating fully on the construction, installation, operation and maintenance of gas, gasoline, kerosene and crude petroleum engines.

THE CLASS JOURNAL CO.
910 S. Michigan Ave., Chicago (38)

PRICE \$2.50
Charges Prepaid



Steel Protectors

Each section 2" wide $\frac{1}{8}$ " thick. They hook to rim. As flexible as ever. Anti-skid, can't blow out or rim cut.

HOW CAN THE RUBBER WEAR OFF IF IT IS COVERED WITH STEEL?

Try 2 or 3 sections over any old blowout

Special prices to the first in new territory

Kimball Tire Case Co. ¹⁷³ Broadway. Council Bluffs, Ia. Tire covered complete



OSGOOD AUTOLITE DEFLECTORS

have experienced a tremendous demand. More dealers are desired—also local managers in every city and county to extend distribution. Attractive proposition. Hurry! Ask for particulars.

This glareless glass fits any automobile headlight. Deflects rays without diminishing light. No glare. Avoids accidents. Equally good for city or country driving. Nothing else like it.

Endorsed by Chicago and other municipal authorities where glaring headlights are condemned. Retail \$5 the pair. Money-back guarantee. If your dealer cannot supply you, order direct.

OSGOOD AUTOLITE DEFLECTOR COMPANY
Dept. 12, 404 First National Bank Building CHICAGO

CONNECTICUT AUTOMATIC IGNITION

Gives its hottest spark for starting and at low speeds.
Gives a better spark than the magneto at highest attainable speeds.

Investigate—Catalogue & Request

CONNECTICUT TELEPHONE & ELECTRIC CO., Inc.
MERIDEN, CONN.




Nimotor For Tops, Curtains and Upholstery

The Recognized Standard in Rubberized Cloths

Guaranteed not to leak or fade

So attractive in appearance—they help to sell the car

Send for 1915 Samples

Prices Right
Any Quality
Prompt Shipments



Detroit EIGHT \$1295

Full Floating Rear Axle, Platform Rear Spring Suspension, All Recording Instruments in One Unit, Red Electric Flash Oil Gauge, Carburetor Above Frame, 112 Inch Wheel Base, Left Hand Drive, Center One-Lever Control, Multiple Disc Clutch in Oil, Less than 2500 Pounds, 34 H. P. at 1800 R. P. M.

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Fours...\$850 to \$985
Sedan Eight...\$1460
Sedan Four...\$1150



STROMBERG CARBURETOR

"The Accepted Standard"

The New Stromberg Carburetors make records for Economy, Power, Acceleration and Smoothness of Running.

Write for Information

Send us make and model of your car and we'll tell you which new model Stromberg is best adapted for it.

STROMBERG MOTOR DEVICES CO., Chicago, Ill.

KISSELKAR

The Big Values of the Year

36-Four—\$1450
42-Six—\$1650
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For all-year driving get the Kissel Detachable Sedan Top for but \$350 additional.

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- Every Inch a Car -

Schrader

Universal Valves

For sale by Tire Mfrs., Jobbers and Dealers or
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Trade Mark


Reg. Apr. 30, 1895.

TRADE MARK REG. IN U.S. PAT. OFFICE

SCHRADER UNIVERSAL TIRE PRESSURE GAUGE

MADE BY A. SCHRADER'S SON, INC., N.Y.






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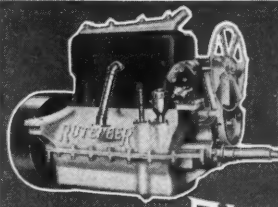
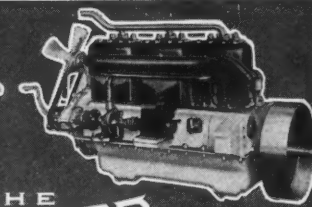
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¶ Fully Guaranteed. ¶ Does the work. ¶ Cost—a fraction of electric starting cost. ¶ No harm to car; does not interfere with cranking in usual manner. ¶ Releases in case of backfire. ¶ Retards spark automatically before starting. ¶ Time tried success—no experiment. ¶ Be sure you get the BOSTON STARTER. ¶ Ask the Ford dealer or your dealer or write.



Boston Starter, Boston Mass.



THE RUTEMBER MOTOR

possesses the virtue of economy in first cost and in subsequent up-keep, revealing the merit of sterling quality in every detail of construction and renders as consistent and efficient service as motors costing twice as much to buy and maintain.

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See the new enclosed Ford cars

The Coupelet, a luxurious two-passenger car, and the five-passenger Sedan, a roomy, stylish family car. Prices of the Ford line; Coupelet \$750, Sedan \$975, Runabout \$440, Touring Car \$490, Town Car \$690 f. o. b. Detroit fully equipped.

Ask nearest Ford branch or dealer about Ford profit-sharing with retail buyers.

Ford Motor Company.

Detroit, Mich.



MASTER CARBURETERS

Reg. U. S. Pat. Off.

Note the wonderfully fine vapor created by the MASTER'S numerous jets.

This means utmost economy, smooth running, together with greatest power and speed.

Fuel Inlet
Master Throttle and Fuel Distributor

The New World's Standard—No Adjustments

MASTER CARBURETOR CORPORATION
Woodward & Hancock Aves., DETROIT
Pacific Coast States—Master Carburetor Co., Inc., Los Angeles, Cal.

PENNSYLVANIA Oilproof VACUUM CUP TIRES

Making their mark everywhere

Guaranteed for 4500 miles

Pennsylvania Rubber Company
Jeannette, Pa.



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HOUK Detachable WIRE WHEELS

"The wheel that makes any car modern"

GEORGE W. HOUK COMPANY
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BROWN Jr. Tire Pump

NEW PRICE With Gauge and "T," \$5.50

Built like a motor with lapped rings. A high grade pump at a small price for medium size tires. You cannot afford to run your car without this pump.

Send for Leaflet—Just Off the Press

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PATENTED
NOV. 28, 1905
NOV. 2, 1909
AUG. 22, 1911
OCT. 17, 1911
NOV. 3, 1912
FEB. 16, 1914
OCT. 28, 1914

HOLLEY CARBURETOR

NO MOVING PARTS
ONLY ONE ADJUSTMENT
WRITE FOR PARTICULARS



Holley Brothers Co.
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THE POWERFUL, SILENT SPHINX

\$695

A REAL AUTOMOBILE

The lightest, strongest, most serviceable and economical machine of its kind ever built.
112 inch wheel base. Electrically started and lighted.
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"Bougie Mercedes"

Insulation of DOUBLE STONE (Blue Enameled) does not break. Platinum-alloy electrodes do not burn away. Four sparking points ensure a fat spark. HERZ PLUG is self-cleaning; it is GUARANTEED A FULL YEAR. Costs \$1.50; worth more. Order from your dealer or direct.

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In Using—

NON-FLUID OIL



You know that every gear or bearing upon which it is applied can do its hardest work without the slightest trace of frictional injury. That used instead of LIQUID oils, or greases, it will make your cars most efficient, minimize your repairs, and decrease your lubrication bills.

90% of all automobile manufacturers recommend it.
"K. No. 00 Special" grade for sliding gear transmission
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Sold by leading dealers everywhere. Look for the orange-colored can bearing sprocket-wheel trade-mark shown above

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Proved by all world's records to be

First in

Speed, Accuracy
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"The Machine You Will Eventually Buy"

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NEW YORK

(69)

Write
to-day for our
Territorial Agreement
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New \$1000

**Inter-State
"FOUR"**

The one popular priced car with
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in the country.

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PLAIN, "WM"
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GAS, OIL, AND ELECTRIC
CORCORAN LAMP CO.
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SALISBURY

AXLES WHEELS
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Salisbury Wheel
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No Garage Can Do Without

the means to determine promptly the exact condition of the electrical equipment of any automobile.

Weston

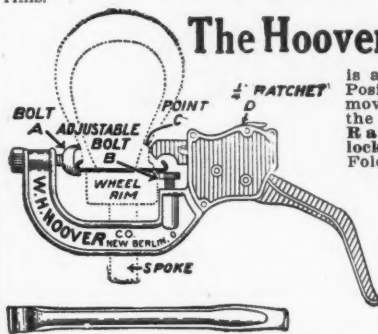
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are absolutely dependable in locating trouble in starting and lighting systems, or proving its absence. Built to conform in every way with the exacting Weston standard, they are accurate, serviceable, reliable, yet inexpensive. Write for special booklet describing Model 280.

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This Powerful and Handy Special Tool
may be used in the dark for removing quick detachable and clincher rims.

The Hoover Rim Remover



is a tool that cannot go wrong. Positive action—once set, the movable jaw will always engage the inner rim.

Ratchet holds rim remover locked, leaving both hands free. Folds up for the tool box. A handy tire tool is included.

Price \$1.25: No. 1. for 3 to 4 in. rims; No. 2. for 4 1/4 to 6 in. rims. Write for discounts to dealers.

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This is merely one of our auto necessities. Write for 1915 catalogue.

If your dealer cannot supply you, sent postpaid on receipt of price

MANZEL TIRE PUMP

For FORD CARS, \$7.50

Complete with 12 feet of air hose, pressure gauge, steel gears, etc. The best Ford tire pump on the market. Mechanically perfect, engine driven, made from the finest materials. Removes tire worries and will last a lifetime. Easily installed—no drilling or machine work.

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Also manufacturers of Manzel two-cylinder engine-driven tire pump for all other cars—\$20.00

"Bridgeport"

TRADE MARK

TIRE PUMPS

Are easy to use and easy to sell. They are durable and efficient and are widely advertised. The cylinders are of seamless brass tubing which cannot rust. The "Stapley," the "Aeolus," "Windjammer," etc., give lasting satisfaction. Carry them in stock.

Bridgeport Brass Company
P. O. Box A Bridgeport, Conn.

Here's a mighty big fact to be told in such small space

Two years ago we equipped Haynes cars with Leece-Neville Starting and Lighting Systems. Today, the cars are in service—so are the Leece-Neville Systems, both giving ideal service. A season-after-season test shows up real quality.

THE LEECE-NEVILLE CO.

1059 Power Avenue, Cleveland, O. (46)

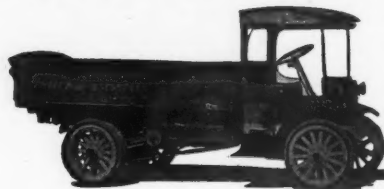
ELECTRIC
ISCO
SYSTEM

Electric Starting & Lighting System

It Spins the Motor

DISCO ELECTRIC STARTER COMPANY
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B.F. Gram's Trucks



Appeal to the man who has had experience in the use of motor trucks.

To him their quality points, the individual clutch transmission, guaranteed springs, self-starter, etc., mean a definite saving in operating costs.

The full line, 1 to 6 tons, is described with all its features in our complete catalog, which will be sent you on request.

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**Join the
Miller Prosperity
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Be the exclusive
Tire Dealer in
your town—the
Miller Dealer.

Write for the Miller
Plan—it doesn't pit one
dealer against another.

THE MILLER RUBBER CO., Akron, O.

The Clearing House of the Motor Car Industry

*For Second Hand Cars, Surplus Parts, Accessories, Tires,
Machinery & all other Special Announcements of a Similar Character*

ADVERTISING RATES ¼ inch—One time, \$2.40. 1 inch—One time, \$4.50. 1½ inches—One time, \$6.75. 2 inches—One time, \$8.75.
Rates for other spaces and longer terms furnished upon request.

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A BARGAIN

8-Ton White truck, standard stake body. Newly painted. Good tires. Used only six months. \$1800.00 cash takes it. Write

Box 199, Wichita Falls, Texas

For Sale—Six Ford Taxicabs

nearly new. Have been in service ten months. Will sell one or all of them very reasonable. Address GLOBE GARAGE, Kalamazoo, Mich.

GET OUR LATEST BULLETIN OF USED CARS

You will surely find one to fit your requirements. You can get from us good, serviceable machines of various makes for \$400 and up. Let our reputation be your guide.

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Have Two 14-Passenger Sightseeing Cars with solid tires all around, double chain drive, which I will sacrifice if taken at once.

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Mitchells Rebuilt Guaranteed

These cars are fully equipped. Call or write for further particulars.

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Cars and Repair Parts

FRANK F. MATHESON, Wilkes-Barre, Pa.

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Automobile business in small town; will sell more than one hundred cars this season. Will help purchaser through selling season. Five thousand dollar supply trade in connection. Should pay profit from five to ten thousand. Too much other business to look after. Address Box E 296 c/o Motor Age.

WANTED

Location for garage; Iowa or Minnesota preferred. Address Box E 300 care of Motor Age.

HELP WANTED

WANTED

An AI automobile accessory salesman to call on the jobbing trade. A fine chance for the right man to associate himself with a growing concern. Address Box E 297 c/o Motor Age.

Have year round job for right kind of repair man experienced on all makes and who is a good lathe and machine man. Must be strictly temperate and give references, middle aged married man preferred.

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CAPABLE PARTY WITH HIS OWN RACING MACHINE

to enter motor contests throughout the middle west for entire season of 1915, starting May 1st. Must have past experience in track racing and drive a Stutz, National or other car equally well known. Good money and big opportunity for right party. Give reference, past experience, detailed description and model of car with cuts of both car and driver, in first communication. Address Box E. 302, care of Motor Age.

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for second hand High Tension Magnets. We pay cash for them. What have you?

EMERSON MANUFACTURING CO.

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Magneto Service Co.

Selling, Repairing and Exchanging all makes of magnetos and coils. Agents for MARKO STORAGE BATTERY. Batteries repaired and exchanged. 255 W. 57th St., New York City.

Used Bosch, Splittorf, Remy Magnets and coils at cut prices. We repair any make of magneto or coil.

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MAILING LISTS AND STATISTICS. Owners or dealers; any state, county, city; weekly and monthly supplements at lowest prices. Special lists of electric, trucks, Fords, Studebaker, Overland, etc. **MOTOR LIST CO. OF AMERICA**, 1107 Locust St., Des Moines, Iowa.

NEW YORK AUTO LISTS. Daily service covering 1915 registrations already started. Send \$10 for first ten thousand and get my proposition on the entire state or one district. **Peter Donnelly**, Box 9, Capitol Station, Albany, N. Y.

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1915

Auto Mailing Lists of All Lines For Sale

30,370 Auto Dealers, U. S. \$40.00 or \$2.50 per M
6,200 Ford Dealers, U. S. 15.00 or 3.00 per M
19,543 Garages, U. S. 30.00 or 2.50 per M
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21,983 Auto Repair Shops, U. S. 30.00 or 2.50 per M

1,680,000 Auto owners. 2.00 per M

533,000 Ford owners. 3.00 per M

Have every other Auto Trade list.

All typewritten, showing financial rating.

Ask for particular territory wanted.

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Fourteen thousand one hundred copies per issue since the first of the year is the average net page circulation of *Motorcycle Illustrated*, which thoroughly covers the motorcycle and bicycle fields. Read by all the manufacturers and jobbers, and nearly three thousand motorcycle and bicycle dealers. By far the largest circulation in the field.

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Selling out at one-half price, the entire stock of the Service Storage Battery Co., 6-60 to 6-150 lighting, ignition and starting batteries.

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We announce a reduction of from \$20.00 to \$14.00 on our Spare Remountable Wheels for the Ford. We have some good territory left. Why not handle an original line? Carry extra wheel with tire on ready and interchangeable with any of present wheels. Can install outfit at home, then change wheels in less than two minutes. Write for catalogue. Legitimate dealers, get our agency for Spare Wheels, Spring Radius Rods, Fan Belts, Radiators, Cradles, etc. **"ANGIER'S," Dept. B, Streator, Ill., U. S. A.**

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One application of Peerless Lining Dye makes all linings a black uniform color. Ask your dealer.

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Columbus, Ohio

ALL PARTS IN STOCK AT DISCOUNT

Atlas, Bergdoll, Chalmers, Ewing, Alco, Packard, Hudson, Herreshoff, etc. Brown-Lipe Gear Parts, Continental Motor Parts, STA-RITE Rings, \$1.00 each. Regular Piston Rings, 30c each.

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ALL SEASON'S RECORDS MADE WITH
Schebler equipment. Why not get a Schebler model R for your car? Our exchange proposition makes it easy.

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American Motors Company
Write for prices on parts needed in connection with American cars.

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AMERICAN UNDERSLUNG
We are the sole owners, manufacturers and distributors of repair parts for ALL MODELS AMERICAN UNDERSLUNG CARS.

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Ampvo 6-volt 100-amp. Batteries, \$10.00 Each
Limited sale, absolutely new and guaranteed. Two Willard, one Exide 6-180, like new, 12.00 each.

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We have purchased the jigs, tools, drawings of the Atlas Motor Car Co. and are the only concern supplying these parts. Write us, giving model and number. Parts shipped immediately.
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Type 10 Buick parts. 9K Stoddard-Dayton motor, \$100. 50 H. P. 35 H. P. Continental motor, \$100. Bucket seats, \$18 the pair. Prestolite tanks, \$9.

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We maintain a complete stock of parts for the above cars.

PHILADELPHIA MACHINE WKS.
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New and second hand for many makes of cars for sale cheap. Write us when in need of parts.
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Sold at Auction

This factory consisted of 7-passenger Keeton cars and the Carnation Cyclecars. We bought nearly all the parts and cars and can furnish any repair parts for these cars.

7-passenger Keeton cars, new, guaranteed, complete with silk mohair top, speedometer, clock, windshield, two storage batteries, electric starter, lighter, large size tires, 6-cylinder 4-speed selective transmission, painted maroon, dark green, blue, yellow, brown or black. The regular price is \$3500.00. We will sell a few at the special price of.....\$1200.00
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Splittorf magnetos, Type A..... 10.00
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100 34x4 1/2 slightly used casings.....each 7.00
100 36x4 1/2.....each 7.00
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500 Set Car-Nation shaft drive rear axles complete with front axle and wire wheels.....per set 30.00
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5000 yds. Mohair.....per yd. .70

Send for our Bargain Sheet on our regular line of Accessories.

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ABBOTT-DETROIT

We got repair parts, complete stock, all models Purchased direct from E. F. Gerber

Now on sale at the Big Shop, where repair parts for all cars are always to be had. Get our prices and we both make money.

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All Parts for All Cars

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Seat covers and body building, remodeling and trimming. Write for prices.

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We guarantee them as
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All sizes and makes in stock ready for immediate delivery—At prices that will interest you.
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E. M. F. Motor Parts for sale.

Bearings, Ball and Annular, all sizes, at half manufacturer's cost.

NICHOALDS COMPANY
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5-pass. fore-door, stream line bodies, upholstered and painted, all sizes and styles in stock, \$55.00 to \$85.00.

Model T Ford Delivery Bodies with top and upholstered seat, carrying space 57"x40", clearance under top 54", \$75.00.

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E. M. F. Fenders, black enameled—per pair, \$4.50; per set, \$8.00.

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| Spark Plugs— | Each | 4 for |
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1,000 asst. copper gaskets, all the popular sizes in round and flange types.....\$ 3.00

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Ford Model "T" radiators..... 16.00

High grade cylinder oil, 100 bbls. in the lot, while they last...per gal. .16
Sold in barrel lots only, about 50 gal. in bbl.

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Do you want our catalogue? It's yours for the asking.

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For FORD CARS—14 STYLES

Painted or in Primer

Reduced Prices on flare board and screen panel bodies to fit Poss cars

Motor Truck Bodies and Cab Tops

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The Clearing House—continued.

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MACHINERY—All Kinds—Chelsea, Mich. **SUPPLIES**—All Kinds—Chicago, Ill.

At Port Huron, Michigan

In the matter of the Havers Motor Car Co., bankrupt, at Port Huron, Michigan, our Company has been appointed Special Liquidators for the Trustee, acting under authority of the Referee in Bankruptcy.

This material includes cars, accessories, motors, transmissions, radiators, bodies, fenders, Firestone rims and everything in general that entered into the construction of the Havers car, machine tools, hand tools, cranes, fire extinguisher apparatus, vices, office furniture, files, typewriters, adding machines, etc., etc.

At Detroit, Michigan

Complete stock of high grade machine tools, equipment and automobile accessories.

At Chicago, Illinois

The largest stock in the world of high grade machinery, tools, equipment, building material and supplies in general.

At Indianapolis, Indiana

We are closing out an enormous quantity of automobiles, automobile parts, bodies, rear axles, front axles, frames, upholstering material and complete equipment to build automobiles, machinery, hand tools, raw stock and general supplies, office furniture, etc., etc.

At Pontiac, Michigan

We have several complete six-cylinder chassis, besides frames, self-starters, transmissions, rear axles, radiators, machinery and equipment.

Catalogs Free

If interested in any part of the above stocks, catalogs and literature concerning same will be promptly mailed you.

A complete book is issued of our general stock, but we are at the present conducting Special Sales on the material at Port Huron, Indianapolis and Pontiac. At each point we have a Special Representative prepared to close sales.

—FOR FULL INFORMATION ADDRESS—

HARRIS BROTHERS COMPANY

DETROIT, MICHIGAN or
PORT HURON, MICH. or
INDIANAPOLIS, IND. or
CHICAGO, ILLINOIS

Cocoa and Carpet Mats, Hand Made Seat Covers, Auto Tops Built and Repaired.

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2334 Michigan Ave. Chicago, Ill.

Constant Exposure in All Weather Causes Decay

In Mohair, Duck and Canvas tops and curtains. Peerless Mohair Top Dressing adds new life, waterproofs and renews the finish. Ask your dealer.

THE COLUMBUS VARNISH CO.
Columbus, Ohio

Croxton, Michigan, F.A.L., Elmore, Deal, Midland, American, Henderson, Repair Parts Furnished. We also build and repair radiators, cylinders, crank shafts, etc.

Department O

AUTO PARTS COMPANY
737-39 W. Jackson Blvd., Chicago, Ill.

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Send for our illustrated cut price auto supply catalogue.

Liberty Tire & Supply Co.
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Eureka Diamond Honeycomb Radiator

"Will out-live your car"

All radiating surfaces—no fins—one of the most efficient coolers made. Very strong and handsome. Built in any size or design. New cores put in any radiator. Also Repairing. Absolute satisfaction guaranteed.

EUREKA AUTO PARTS MFG. COMPANY
1915-17 Pine St. St. Louis, Mo.

F. & H. WIRE WHEELS

Equipped with F. & H. Special Wire Wheel Rims. Adaptable to any car. Complete equipment for Ford cars.

THE F. & H. WIRE WHEEL CO.
Springfield, O.

Ford Connecting Rod Bearings

Of high grade bearing metal, perfect fit guaranteed. Dealers, write for agency proposition.

AUTO SPECIALTY CO.
3805 6th Ave. Des Moines, Iowa

FORD CAR BODIES

Commercial bodies guaranteed to fit Model "T" Ford. Bucket seats not painted or trimmed, \$5.00 per pair. Trimmed and upholstered backs and cushions, \$15.00 per pair. We also build a full line of Speedster bodies complete; also Ambulance and Undertakers' cars, all for Ford chassis. Send for our catalog. Agents wanted everywhere.

COLUMBIA BODY CO., OF DETROIT
21-23 Selden Ave. Detroit, Mich.

Ford Cut-outs—Ford cut-outs, with brass lock open pedal, complete, \$1.15; with enameled pedal, \$1.00.

Brass Hammers—Polished brass hammer with handle, weight 1 lb., price \$0.65.

Brass for Bushings—Cored brass for bushings, all sizes. Write for prices.

Lincoln Machine Shops, Lincoln, Ill.

FORE DOORS

Made for all old cars without the doors. We have all patterns. Just give us the name of your car.

CHICAGO AUTO BODY CO., Chicago, Ill.

Ford Flare Board Bodies

for mounting on rear of roadster body. Sizes 31 wide by 40 in. long, 10 inches high, \$25.00. F. O. B. Detroit. Size 31x80x10, \$28.00 F. O. B. Detroit. Bodies are strong and light, hinged tail gate. Painted black rear lamp bracket and fenders furnished, making it quickly interchangeable with turtle back.

JOHN C. NAGEL
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HARRY M. SMITH
Ford Specialist,
253-255 Madison St. Passaic, N. J.

FORD WHEELS WITH DEMOUNTABLE RIMS \$20

4 painted wheels with 30x3 1/2 Demountable Rims, extra rim, 25 new hub bolts and special wrench. Carry one extra pumped up instead of two extras, flat. Many advantages.

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LANSING, MICH.

FORD STREAMLINE HOOD

Make your 1915 Ford a real streamline car. We furnish you a high grade, well designed streamline hood, all enameled and complete with fittings necessary to make your Ford a real streamline car, for \$7.50. Write for circular.

U. S. AUTO PARTS CO.
Kalamazoo, Mich.

The Clearing House—continued.

FOR SALE AT A BARGAIN

New 5x6 four-cylinder, governor-controlled engine, fully equipped, with carburetor, magneto. Will sell for much less than cost. **FRED HANSON**, 576 Prior Ave., St. Paul, Minn.

FOR SALE

A small number of modern, well designed and constructed six, five and four-passenger touring bodies and comfortable roadsters painted and trimmed. Write us.

IRVIN ROBBINS & CO.

Industrial Building, Tenth and Canal
Indianapolis, Ind.

FOR SALE

One plain dividing head for cutting gears; has 10 dividing plates giving most divisions necessary up to 120. Price, \$20.00

AUTO SPECIALTY CO.
3805 6th Ave. Des Moines, Ia.

For Sale: Storage Battery Booster (Westonhouse) 4 H. P. 110 V. D. C. motor direct connected to a 3 K. W. 50 H. P. D. C. generator in excellent working order. Price \$100.00. **Lucas & Son**, Bridgeport, Conn.

GET IN ON THE GROUND FLOOR

BE THE FIRST TO OPERATE A "JITNEY" BUS LINE

In your town or neighborhood. Western "Jitney" Bus Owners making \$75 to \$100 per week. 1,500 now operated in San Francisco and 700 in Los Angeles in short time, and is now spreading rapidly eastward.

Why Work for \$25 a Week when on an investment of \$100 you can start in business for yourself?

Write for Particulars—Now. Below are a few bargains that would make excellent "Jitney" Buses:—Buick, \$150 upward; Fords and Reos, \$125 to \$300; Overland, \$150 to \$300; Chalmers, all prices; Cadillacs, \$250 to \$800; Regal, new, 7 pass., \$595, lists at \$1,750, and a thousand other bargains. Call and be convinced.

ACCESSORIES REDUCTIONS

New Herschel-Spillman Motors, 4 and 6 cylinder, \$275; other motors, \$65 up. \$300 fore-door touring bodies now \$85. Runabout bodies—1914 Ford, new, \$35; others \$40 and \$50. Runabout tops \$15. Touring \$25 (measurement blank sent on request); Racing Seats \$10 each. Spicer Universal joints \$4 each; mechanical oilers \$4 up; windshields \$5 up. Special nickel 1-piece Rainvision shield \$10; Disco self-starter \$5; Remy complete dual system magnetos, Model R. L. and R. D., \$25; others \$5 up; Rayfield, Stromberg and Schelber carburetors \$5 up; gloves \$1 up; Raccoon Fur Coats (special bargain) \$18; double plush robes \$3.50 each. Bulb horns 75c; electric horns, complete with wire and button, \$1.95; hand horns (mechanical), \$1.50; exhaust horns (all sizes), \$2.50; spark plug pumps \$5; double action pumps \$1.75.

SPARK PLUGS

Special, 5 for \$1; Mosler, 4 for \$1; Timesco, 3 for \$1; Bearings all \$1 up to \$5.

SPRING SHOCK ABSORBERS

\$12.50 buys the latest in spring shock absorbers, equal to the highest grade on the market selling at \$35. Easy to install. On all good cars as regular equipment. Hartford-Mondex shock absorbers, \$5 each. Rims, detachable or demountable, \$2.50 and \$3.00 each; all makes and sizes. Storage batteries \$6; tool boxes, \$1 and \$2; raincoats \$1.90; rubber "slip-on" shirts \$2.50; clocks \$1 up; gas tanks, \$2.50; Prest-O-Lite (genuine) tanks, style B, \$12.50 (complete).

Send for Our "Price Wrecker" Free.

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WORLD'S LARGEST DEALERS IN NEW AND USED CARS AND ACCESSORIES.
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There are good profits to be made handling our line of Ford Delivery Bodies; twenty styles to select from; write us for list and discounts. **WE ARE FORD COMMERCIAL CAR AGENTS**
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LIKE A VARNISH IT CAN BE USED AS THE FINISHING COAT

Where the lustre has died out. Peerless Mirroroid leaves a rich, full lustre on varnished surfaces; dry in four to five hours. Ask your dealer.

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Columbus, Ohio

Lozier Repair Parts

We have on hand repair parts for Lozier Cars at reduced prices. Send old parts for replacement.

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MICHIGAN OWNERS!

We can ship immediately every part for every Michigan car, no matter what the model. We purchased and are successors to the Michigan Motor Car Co. and have sole access to all patterns and engineering data.

Every part guaranteed to be accurate. Shipment same day order is received.
MICHIGAN MOTOR CAR PARTS CO.
Successors to Michigan Motor Car Co.
KALAMAZOO, MICH.

MAXWELL OWNERS AND REPAIRMEN

Why pay 20% advance for your repair parts for the old models of MAXWELL cars? We can supply 90% of your wants at the old list price. Transmission gears and parts in stock for Cadillac, Case, Croxon, Dorris, Elmore, Moline, Moyer, Overland, Regal, Selden, Stoddard, Velle and 75 others at cut prices. Why pay more? Send for price list.

M. P. SUPPLY COMPANY
Atlanta, Georgia

MORE SPEED FOR THE FORD

Special ratio Differential Gears for the Racy Type Ford.

2½—1 ratio.....\$15.00 Set
3 —1 ratio..... 15.00 Set

Absolutely interchangeable with the present gearing

DETROIT RADIATOR & SPECIALTY CO.
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Moving to Larger Quarters

On account of our large increase in business on and after March 1st we will be located at our large new completely equipped factory at 1712-1714 Michigan Ave.

Illinois Auto Sheet Metal Works

58-60 E. 16th St. CHICAGO, ILLS.
After March 1st 1712-1714 Michigan Ave.

NICKEL PLATING
Auto parts replated. Carburetors, radiators and lamps made like new. High grade work at low prices.

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550 W. Van Buren St. Chicago, Ill.
Telephone Harrison 4848

No More Sticking of Tires

One coat of Peerless Rim Paint keeps the rims free from rust and allows the tires to be removed with ease. Ask your dealer.

THE COLUMBUS VARNISH CO.
Columbus, Ohio

One Minute Ford Tire Tool

This tool will positively completely change a Ford clincher tire in one minute without labor. Will send it postpaid for \$1.00. Dealers, send for circular and dozen price.

Heyn's Bazaar, Detroit, Mich.

Prest-O-Lite Gas Tanks B, \$10.50, Black and Nickel Windshields, \$6, Ford Gas and Electric Head Lamps, \$3.25 pair; Spark Plugs, \$0.25. One-third with orders.

BENEDICT, 63 Winder St., Detroit, Mich.

OVERLAND BODIES

Model 79 Overland Touring Bodies complete with top and wind shield, brand new.

\$150 Each

Overland Motor Company
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Paint Your Car Yourself

Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

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Bucket Seats
Jitney Bus Bodies
AUTO REMODELING CO.
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RACING SEATS
High, narrow back, very comfortable. Upholstered in high grade leather. Black, red, brown or any Spanish color. Special price, \$25.00.
CHICAGO AUTO EQUIPMENT CO., 319 So. Jefferson St., Chicago, Ill. Phone Wabash 7244.

RADIATORS

NEW GUARANTEED

Tubular. Honeycomb.
Ford T.....\$17.00 \$19.50
Buick 10 19.75 22.50
Hudsons, 20-33..... 29.00 29.00
Overlands 31.00 33.00

We have radiators, both tubular and honeycomb, to fit any car. Write us for prices before buying. Send in your old radiator for repairs. We are experts. We'll make allowances on your old radiator.

WORLD'S LARGEST DEALERS
in automobiles and accessories. Send for the great

PRICE WRECKER
the money saver, covering everything pertaining to an auto.

TIMES SQUARE AUTO CO.

56th and Broadway New York
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The Clearing House—continued.

Remember

We are the original repair parts factory. We furnish repair parts for over fifty-three models of cars, such as Warren, Elmore, Marquette, Rainier, Welch-Detroit, Welch-Pontiac, F. A. L., Reliable Dayton, Barnes, DeLuxe, Demot, Michigan, Cutting, Northern, Queen, Wayne, Crow, Anhut, Herreshoff, Henderson, and many others. If you want any part for an auto, write us.

Specials This Week

TOPS

| | |
|--|---------|
| Cadillac tops, mohair, complete..... | \$22.00 |
| E. M. F. Roadster..... | 10.00 |
| E. M. F. Touring Car..... | 15.00 |
| Chalmers 20..... | 22.00 |
| Hupp 20 Roadster, used..... | 6.00 |
| Maxwell Model 25..... | 12.00 |
| Buick Model 10 Touring Car..... | 10.00 |
| Paige Tops..... | 12.00 |
| Model T Ford, complete with curtains and top boot..... | 18.00 |
| (And many others.) | |

RADIATORS

| | |
|---|---------|
| Ford T Honeycomb—guaranteed new..... | \$19.50 |
| Ford T Honeycomb—V-shaped—guaranteed new..... | 24.50 |
| E. M. F.—all models..... | 27.50 |
| Oakland 42—V-shaped..... | 30.00 |
| Oakland 38-40-25..... | 27.50 |
| Hudson 20 Honeycomb..... | 28.50 |
| Buicks, all models—guaranteed new. | |
| Get our prices. | |

REAR AND FRONT AXLES

| | |
|--|---------|
| 1/2 Floating Weston-Mott..... | \$25.00 |
| Full Floating Sheldon Axles..... | 50.00 |
| Full Floating Lewis and Weston-Mott..... | 75.00 |
| McCue..... | 50.00 |
| E. M. F. 30 Rear Axles with Transmissions..... | 65.00 |
| Front Axles, all styles..... | 10.00 |

MAGNETOS AND COILS

| | |
|---|---------|
| 4 cyl. Splittorf kick switch coils..... | \$ 8.00 |
| 4 cyl. Remy coils, Models S-T-R-L and RD..... | 6.00 |
| 4 cyl. Briggs coils..... | 6.00 |
| Splittorf Tubular Coils..... | 6.00 |
| 4 cyl. Remy, Splittorf, Briggs, Heinze and Pittsfield Magnetos, each..... | 10.00 |
| 4 cyl. EU 4 Elsemann High Tension..... | 25.00 |
| 4 cyl. High Tension Volta Magnetos..... | 15.00 |

SPARK PLUGS

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|--|--------------|
| Guaranteed regular 75c kind, 1/4" Standard, 1/4" A. L. A. M., while they last..... | 6 for \$1.00 |
| 1/4" Champion X, 39c each..... | 4 for \$1.25 |
| Motorcycle plugs, Metric, 25c each..... | 4 for 80c |

CARBURETORS

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| 1 1/2" Model G Rayfield..... | \$10.50 |
| Model O Schebler, 1 1/2"..... | 5.19 |
| 1" Kingston for Fords..... | 3.00 |
| 1 1/4" Kingston..... | 3.95 |

FOSTER SHOCK ABSORBERS

Complete with fixtures. Set of four, \$4.00

REAL BARGAINS

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|--|------------|
| 11" Bullet Electric Headlamps, per pair..... | \$ 6.50 |
| Electric Tail Lamps..... | 1.25 |
| Electric Bullet side lamps, per pair..... | 3.00 |
| Wheels—all sizes..... | 3.00 |
| Hand operated Horns..... | 4.25 |
| Clear Vision Windshields..... | 7.90 |
| Thermos Bottles..... | Each, 1.45 |
| Deaco Generators..... | 18.50 |

FORD GEARS AND WHEELS

| | |
|--|---------|
| Special 2 1/2 to 1 and 3 to 1 Differential Gears, per set..... | \$15.00 |
| Complete set of 4 30x3 1/2 Demountable Wheels and 5 rims for your Ford, complete with Rim Brace, etc., complete set..... | 22.00 |

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Puritan Machine Co.

Alfred O. Dunk, Pres.
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Radiator Bargain in Studebaker Radiators

We have a quantity of radiators for Studebaker cars on hand, and offer them for immediate sale at an exceptionally low cash price.

Every one is a new Fin and Tube radiator, guaranteed to fit.

Studebaker 35.....\$23.50

E. M. F. 30.....23.50

Send in your check now—They won't last long

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RADIATOR BARGAINS

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| Ford Model T Tubular..... | \$16.00 |
| Ford Model T Honeycomb, V-shaped..... | 25.00 |
| Buick 16 and 17..... | 28.50 |
| Buick 10..... | 20.00 |
| Hudson 20, 32 and 33..... | 28.50 |
| Chalmers 30..... | 30.00 |
| Everett 30 Tubular..... | 14.00 |

Write for prices on any other makes

AUTOMOBILE APPLIANCE CO.
1436-38 So. Michigan Ave., Chicago, Ill.

We Tear 'Em Up and Sell the Pieces

We Can Save You Money on Repair
Parts or Supplies for Your Auto

Can supply you with Crank Cases, Crank Shafts, Cam Shafts, Cylinders, Pistons, Connecting Rods, Radiators, Gears (any style), Timers, Magnetos, Coils, Carburetors, Manifolds, Water Pumps, Transmissions, Rear and Front Axles, Wheels, Steering Gears (complete), Steering Wheels, Gasoline Tanks, Wind Shields, Springs, Bodies, Seats and Cushions, Jacks, Tires and Tubes, Head Lamps, Side Lamps and Tail Lamps (any style), Prest-O-Lite and Search Light Tanks, Horns, Mufflers—in fact, any part of an auto.

We also buy old autos—condition no object—or any part of an auto, or if you want to trade parts we will trade with you.

OUR GUARANTEE TO ALL—IF NOT SATISFIED WITH YOUR BARGAIN, RETURN AND WE WILL REFUND YOUR MONEY.

SPECIAL BARGAINS

| | |
|---|---------|
| New Ford Wheels, 30x3..... | \$ 2.00 |
| Rain Vision Wind Shields, brass finish..... | 10.00 |
| Electric Horns with cord and push button..... | 2.50 |
| Umph Timer, 2 and 4 cyl., new..... | 2.00 |
| Splittorf Magnetos..... | 15.00 |
| Mercedes Type Radiators..... | 12.50 |
| Electric Tail Lamps..... | 1.25 |
| Comb. Trunk and Tire Holder..... | 1.50 |
| Crank Shaft, Model T Ford..... | 5.00 |

Motors

We carry a large line of 2, 4 and 6 cyl. motors in stock. Send for list of same.

AUTO WRECKING CO.

Old Church, 13th and Oak
KANSAS CITY, MO.

Radiator—"THE CONSERVATOR"—Protector (patent pending). Increases power, prevents freezing, prevents misfiring, increases efficiency and saves gasoline. Ford style, \$1.50. Dealers and agents wanted. Every Ford needs one.
JOHN J. HUDSON Tarrytown, N. Y.

REPAIR PARTS

For Auburn, Colby, Halladay, Staver, etc. Send us broken parts of any car; we will duplicate them. Service station for Rutenber motors. Rear axle parts a specialty.

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WHY NOT?

Buy guaranteed goods at prices that are right. You can order direct from this ad. We will guarantee the material to be new and in first class condition.

DEMOUNTABLE WHEELS

For Ford and Maxwell Cars.

We will furnish four wheels and five rims 30x3 1/2, with all bolts and wedges. Complete set.....\$18.00

TOPS

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| For Ford touring cars..... | 16.00 |
| For Ford Roadsters..... | 11.50 |

CROWN FENDERS

For Ford Cars.

You can Put them on in 20 minutes
Set of 4, enameled black..... 12.00

SPECIAL

Get 60 Miles an Hour from Your Ford.
Differential ring gear and pinion, 2 1/2 and 3 to 1 ratio. Pet set..... 12.00
Ring gear, standard Ford ratio.... 3.75
Pinion, standard Ford ratio..... 1.00

RADIATORS

Guaranteed New Honeycomb Type.

| | |
|---------------------|-------|
| Ford T..... | 18.50 |
| Ford V shape..... | 23.50 |
| Hupp 20..... | 25.00 |
| Buick 10..... | 27.00 |
| Buick 16-17-19..... | 32.50 |
| Buick 21..... | 28.00 |
| Overland 69T..... | 31.00 |
| Overland 59..... | 30.00 |

We have a radiator for every car—Get our prices

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| New wheels for Cadillac cars—all sizes..... | \$ 8.00 |
| Brand new 3 speed sliding gear transmissions, complete with control—for center control..... | 50.00 |
| New 30 H. P. Unit power plants—complete..... | 214.00 |
| Gabriel snubbers—per pair..... | 4.00 |
| New Cadillac roadster bodies—upholstered..... | 50.00 |
| New Jacox steering gears—with wheel..... | 10.00 |
| New Gemmer steering gears—less wheel..... | 8.00 |
| Brand new Stewart speedometer heads, flush type and Model 11..... | 4.00 |
| Model D 4-cyl. Splittorf magnetos..... | 10.00 |
| Model SS 2-cyl. Remy magnetos..... | 10.00 |
| 4-cyl. Splittorf kick switches..... | 1.25 |
| Model Schebler carburetors..... | 5.00 |

STORAGE BATTERIES

| | |
|------------------------------|-------|
| 6-40 Guaranteed battery..... | 7.50 |
| 6-60 Guaranteed battery..... | 9.00 |
| 6-80 Guaranteed battery..... | 10.50 |

Springs for All Cars—Prices Right

Windshields, Tires, Lamps—All Sizes
Above Stock Absolutely New

AUTOMOBILE SPECIALTY CO.

475 Woodward Ave., Detroit, Mich.

The Clearing House—continued.

SEAT COVERS

For Automobiles are rapidly becoming a necessity. Dealers are enthusiastic over our proposition.

Write for Descriptive Catalogue and Samples
WISCONSIN AUTO TOP CO.
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Ship that troublesome Carburetor by Parcel Post. We rebuild and install new parts. Factory testing methods used. Service station for Schebler and Rayfield. All work guaranteed.
WILLIS CARBURETOR SPECIALIST
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Sun, Rain, Snow and Sleet Eat Out the Life

Or oil, causing decay in leather, rubber and pantasote tops. Peerless Leather Top Dressing is an oil preparation which adds new life to old tops. Ask your dealer.

THE COLUMBUS VARNISH CO.
Columbus, Ohio

22 H. P. Unit Power Plant
three speed transmission, center control, new goods, guaranteed direct from manufacturers. Best automobile engine bargain ever offered. \$160.00.
Kermath Mfg. Company, Detroit, Mich.

PARTS AND ACCESSORIES WANTED

WANTED—Catalogues and prices on Hydraulic Arbor Press, 15-ton pressure.
Hagge & Claussen Auto Co., Ogden, Iowa

Wanted—Transmission Case for Cadillac 1909 or early 1910, in good condition.
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721½ Third Ave., Soo Falls, S. Dak.

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Established 1894. Main office, Washington.

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A New Radiator or Your Old One
repaired. Repairs in one day—a new radiator in two days. We are specialists also on fenders, hoods, gas tanks, lamps, and all auto sheet metal work.

WABASH AUTO RADIATOR MFG. CO.
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AUTOMOBILE RADIATORS MANUFACTURED
Radiator to fit any car shipped in three days. We fit new core, or any parts in any radiator. Frozen and smashed repaired and returned promptly. All work guaranteed. **Sheppard Mfg. Co., 1331 Jackson Blvd., Chicago, Ill.**

CHICAGO MFG. CO.
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We are the only radiator manufacturers in Chicago making a square tube radiator. New guaranteed cores placed in old radiators. We also manufacture Hoods, Fenders, Tanks and Pans and do guaranteed repair work. Prompt service.

M. & L. Auto Sheet Metal Works
Rebuild and repair radiators, hoods, fenders, tanks, lamps, etc. Tel. Calumet 2348.
1551 Michigan Ave., Chicago, Ill.

ONLY RADIATOR FACTORY IN NORTHWEST

Pioneer manufacturer. Why send your radiator down east when you can ship it to us; save time, expense, freight, money, and get best workmanship. Prices right. Make new radiators, allow for old one.

TODD MANUFACTURING CO.
820-824 Mary Pl. Minneapolis, Minn.

Wright Cooler & Hood Mfg. Co.
1253-5 S. Michigan Ave., Chicago
We make guaranteed radiators that will outlast the car, and can prove to you that our product has 100% better cooling efficiency than others. Standard makes in stock. Our Radiators have stood the test of years.

AMERICAN AUTO SHEET METAL WORKS
We are masters of the trade. Manufacturers of Radiators, Hoods, Fenders, Gas Tanks, etc. Repairing a Specialty.
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REBUILDING AND REPAIRING

A. A. A. SCORED CYLINDERS
Repaired by electricity. Filled with silver composition. Same piston and rings used. No warping of cylinders. Also welding.
L. LAWRENCE & CO.
Newark, N. J.

ANDRE G. CATELAIN
Everready Automatic Engine Starter. General machine work for foreign and American cars. Welding of all metals. Manufacturer Catelain Hose Coupling.
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CYLINDER GRINDING

on automatic machinery by skilled mechanics at prices that will interest you. Gears, axles, valves and parts of all kinds made of high grade alloy steel. Send us your worn or broken parts and we will replace them.
Oxy-Acetylene Welding of cracked cylinders a specialty.

ADAPT MACHINERY CO.
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CYLINDERS REBORED AND REGROUND

Fitted with my light pistons and leakless rings.

Watch this space for the most startling announcement, my latest invention in a light PISTON.

THE LEAKLESS PISTON RING FACTORY

McCADDEN MACHINE WORKS
ST. CLOUD, MINN.

CYLINDER REBORED
Including piston and rings.....\$7 to \$11
STERLING ENGINE CO.
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Crankshafts, Crankcases, Connecting Rods, pistons, scored cylinders made equal to new with our New Silver Iron process—use the same piston and rings.
POWELL-ELLIOTT AUTO REPAIR CO.
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CYLINDERS REGROUND

Including new pistons and rings for \$5 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. Ford cylinders reground, including new pistons, rings and wrist-pins, for \$20.00.

THE CROWN MACHINE SHOP
Crown Point, Ind.

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do the work of a new one. Send us two
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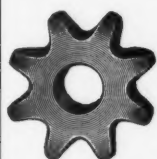
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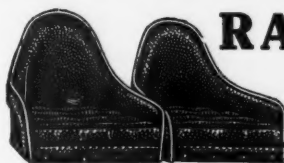
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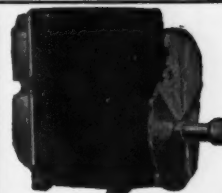
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**FISHER ELECTRIC LIGHTING and
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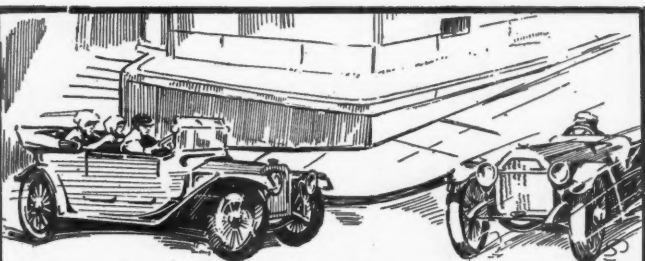
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Elektra Brake Lining Insures Safety of Driver and Car

A good brake lining is one of the very important "little things" that often determine between safety and accident. If it slips in an emergency it may be responsible for sending your car to the scrap-heap; if not, you to the hospital.

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*The Easiest Selling Line of Motor
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3/4-ton with express body, inter-
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| Continental Motor | Russell Full Floating |
| Timken Axles | Jack Shaft |
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No Better Units Built

We ask the opportunity to prove our statements.
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Republic Motor Truck Co., Alma, Mich.
FORMERLY ALMA MOTOR TRUCK CO.

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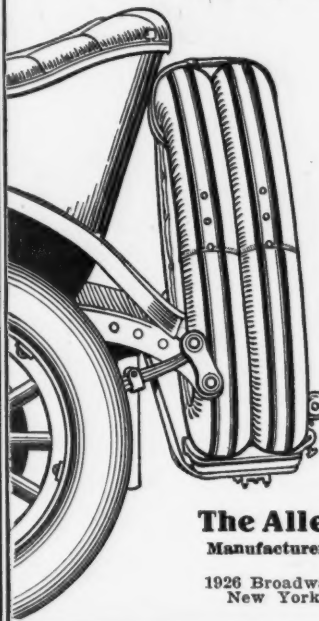
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The deteriorating effects of sunlight, water and oil are completely avoided when the Allen Tire Case covers the spare shoe. Perfect in fit, yet easily buttons on, and is made of finest quality enamel duck, colors to suit the individual owner. Made in all sizes and for all style demountable rims and wire wheels. Prices \$3.00 and up.



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Manufacturers, also, of the Allen Tyrometer,
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on
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Lubrication**

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The Ideal Winter Oil
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Department 1875
FRICK ANNEX

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Star Radial Ball Retainer. "Light Series," for use in Cup and Cone Type Bearing.



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Star Ball Retainers

and



Star Ball Thrust Bearings

STAR BALL PRODUCTS really need no introduction at this time at our hands, for they have long been favorably known and used, all over the world, wherever their use is applicable.

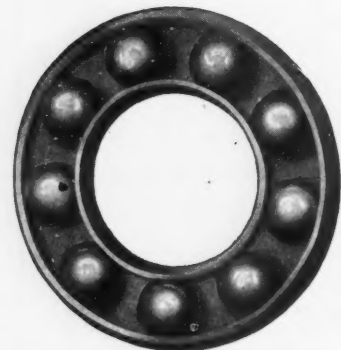
In Europe, Star Ball products practically control the market, and here in the U. S. A., Star Ball patented products, made for years at our Lancaster, Pa., Star Ball Retainer Company's plant, and still under the same efficient management by us, are produced in such quantities, such quality, and at such prices that they have practically no competition.

If you are not already a user of Star products, we will, upon your request, be very glad to send you the Star Ball Retainer size and price lists, which are printed in the conventional S. A. E. loose leaf form and size, punched and ready to bind, handy for refer-

ence. These lists show the inside diameter of the cups, the diameter and number of the balls, the overall and inside dimensions, and flange dimensions of the cones, besides the list price per thousand of the various types of radial ball retainers. The dimensions and prices of the ball thrust retainers are shown on separate sheets.

It is well to note, however, that we carry no stock of ball thrust bearings, but manufacture the same to order only. Send us your blue print of the bearing desired, showing how the same is mounted. Give us the quantity of bearings wanted, and we will be pleased to quote you accordingly. Our illustrated lists also show the various types of ball thrust bearings which we are already tooled up for, and their load capacities under various R. P. M.

Another sheet shows the dimensions of ball retainers, for use in magnetos.

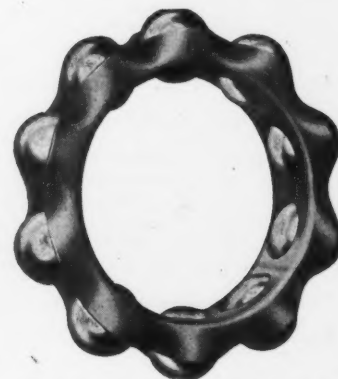


Star Thrust Ball Retainer for use in Ball Thrust Bearings.

For Star lists, prices and discounts address

SALES DEPARTMENT

The BEARINGS COMPANY OF AMERICA
& F. Ball Bearings
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Star Magneto type Retainer for use in Magneto Type Bearings.

When Writing to Advertisers, Please Mention Motor Age.



Chart Showing Months When
Main Transcontinental Routes
Are Best for Motor Travel.









Transcontinental
and Historic



Continental Routes to the Pacific Coast and Intermediate Points of Scenic and Historic Interest Together With Important Options and Feeders

Compiled from Data Furnished By
The Official Automobile Blue Book

Legend

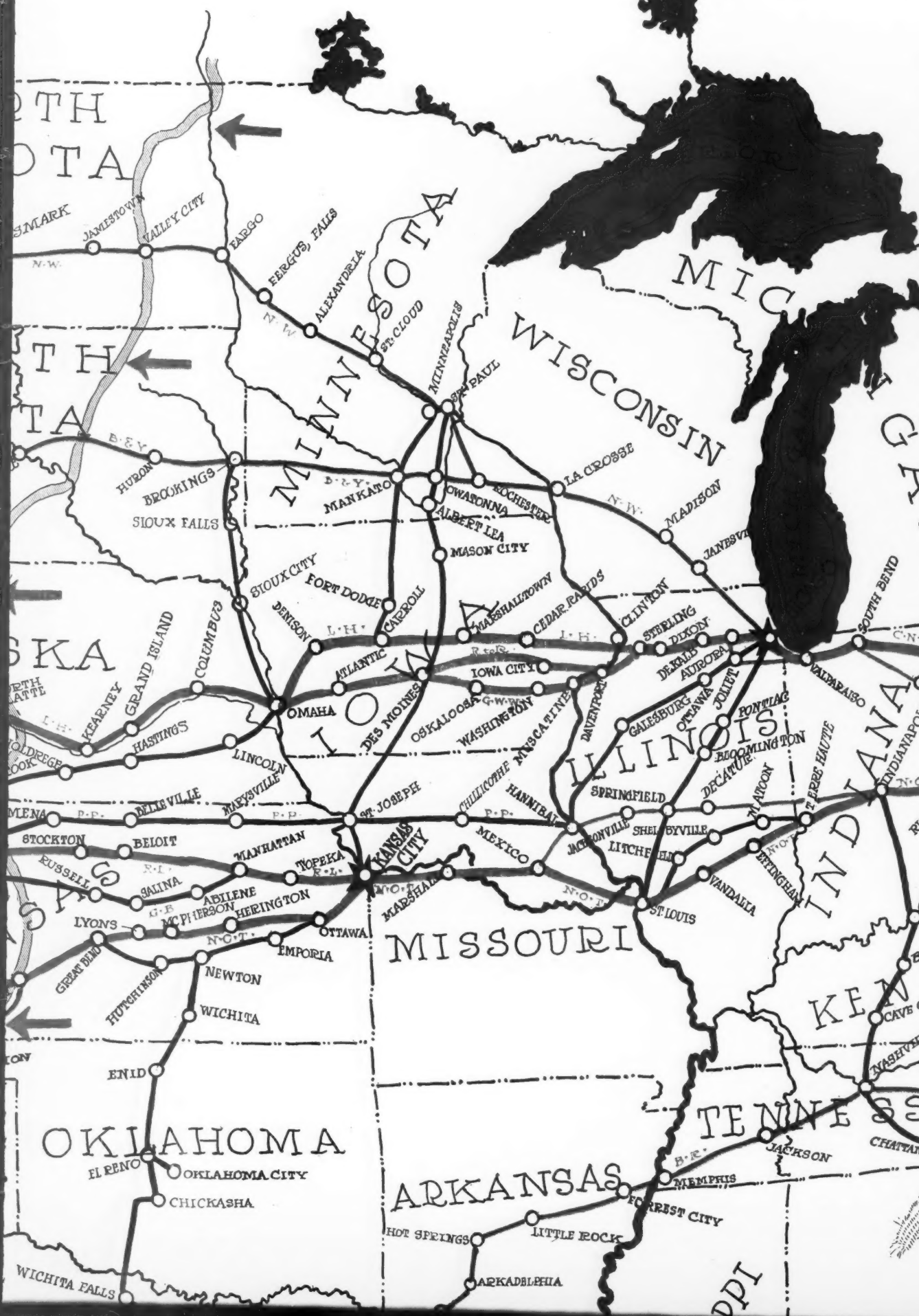
-  Best Routes to be Traveled by the 1915 Tourist
-  Important Feeders and Options to Preferred Routes
-  Secondary Transcontinental Routes and Feeders
-  Feeders and Optional Routes
-  Take On Water Here (Water Bags)
-  20-Inch Annual Precipitation Contour Line
-  Arid Region With Annual Rainfall of 10 inches or Less
-  Desert



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Routes
Travel.

Transcontinental Routes to the Pacific
and Historic Interest Together With

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The Official Auto

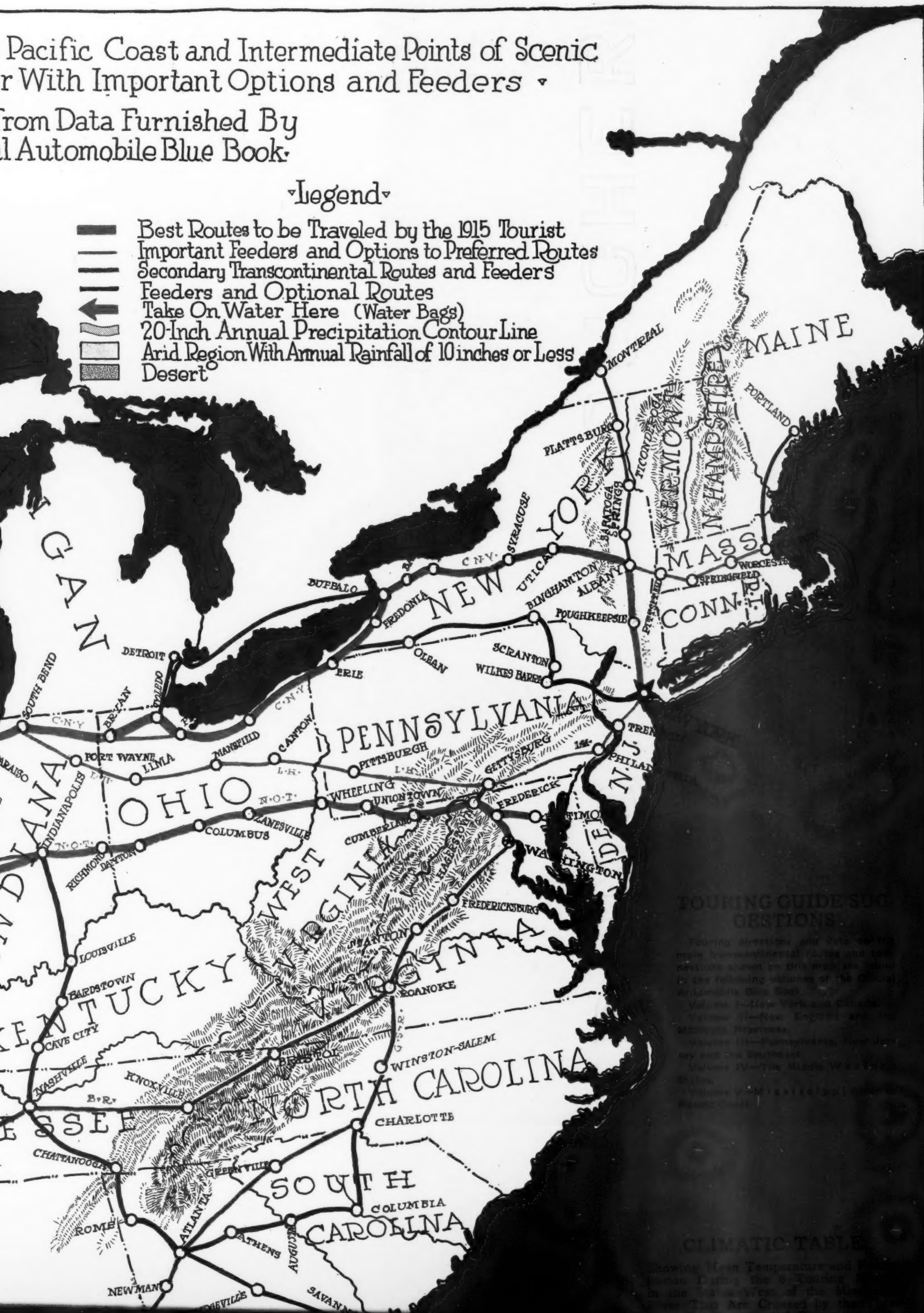


Pacific Coast and Intermediate Points of Scenic Interest With Important Options and Feeders

From Data Furnished By Automobile Blue Book

Legend

- Best Routes to be Traveled by the 1915 Tourist
- Important Feeders and Options to Preferred Routes
- Secondary Transcontinental Routes and Feeders
- Feeders and Optional Routes
- Take On Water Here (Water Bags)
- 20-Inch Annual Precipitation Contour Line
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- Desert



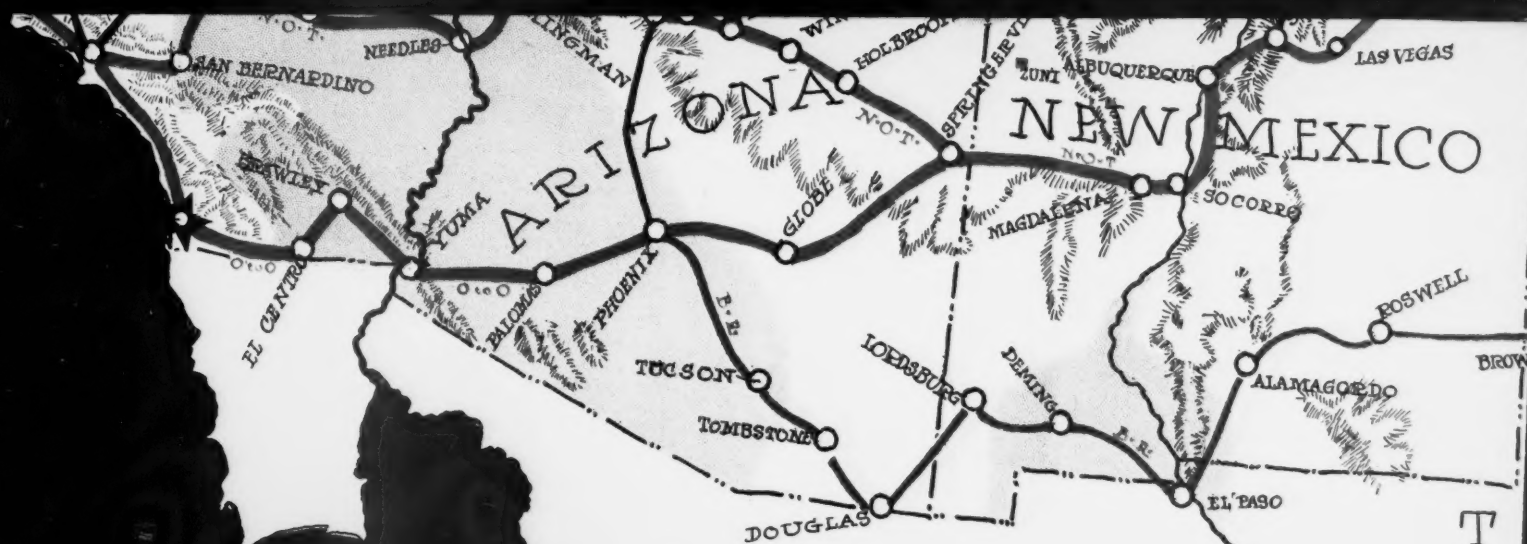
TOURING GUIDE SUGGESTIONS

Touring directions and data taken from Automobile Blue Book and the National Automobile Touring Guide. The following volumes of the National Automobile Touring Guide are suggested for the tourist:

- Volume I—New York and the East
- Volume II—New England and the Middle West
- Volume III—Pennsylvania, New Jersey and the Delaware
- Volume IV—The Middle West and the South
- Volume V—Mississippi and the Gulf Coast

CLIMATIC TABLE

Showing Mean Temperature and Precipitation for the 6 Touring Regions in the Eastern Part of the United States. They Are Grouped by the



Three Main Transcontinental Routes Legend

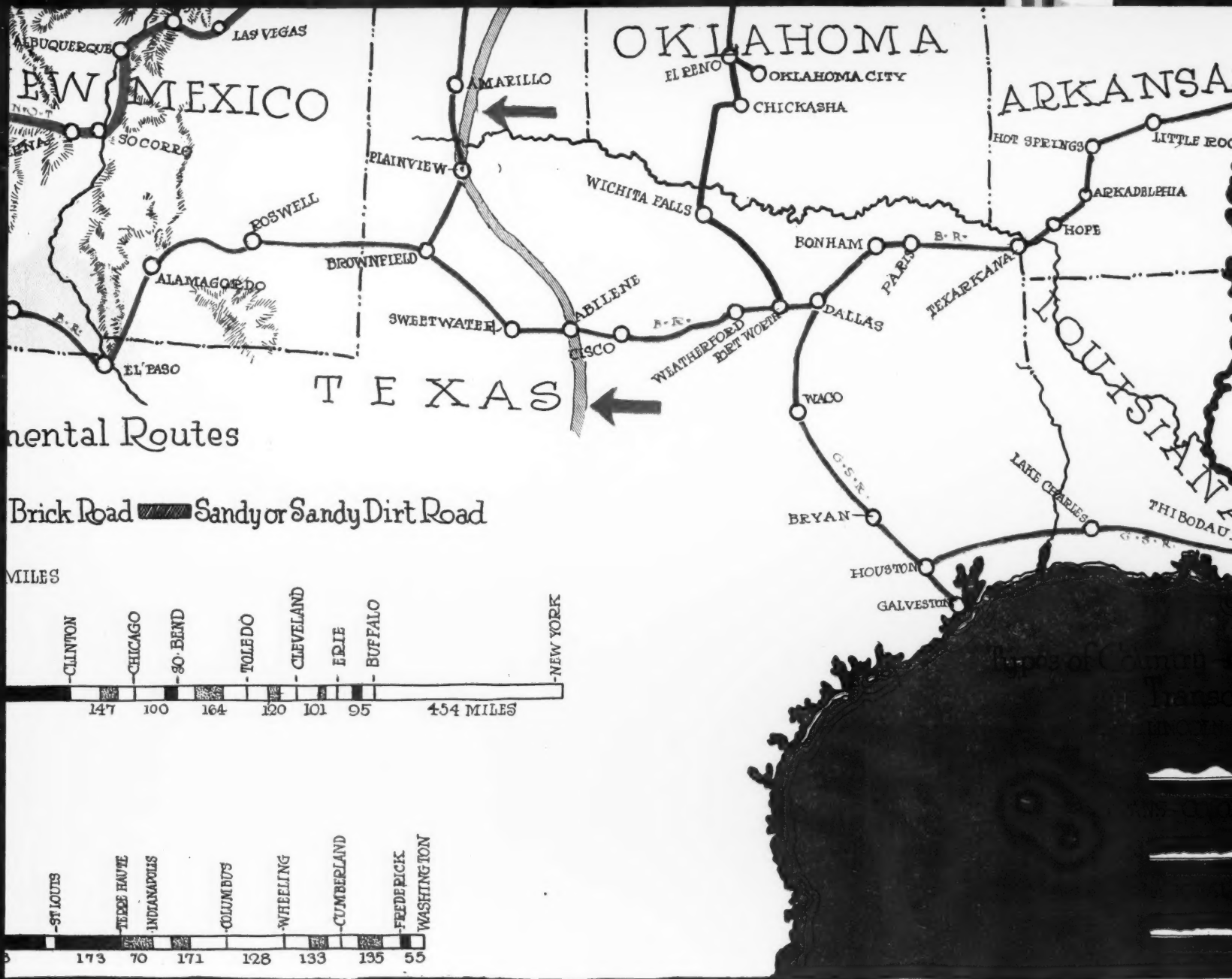
Concrete, Macadam or Brick Road
 Sandy or Sandy

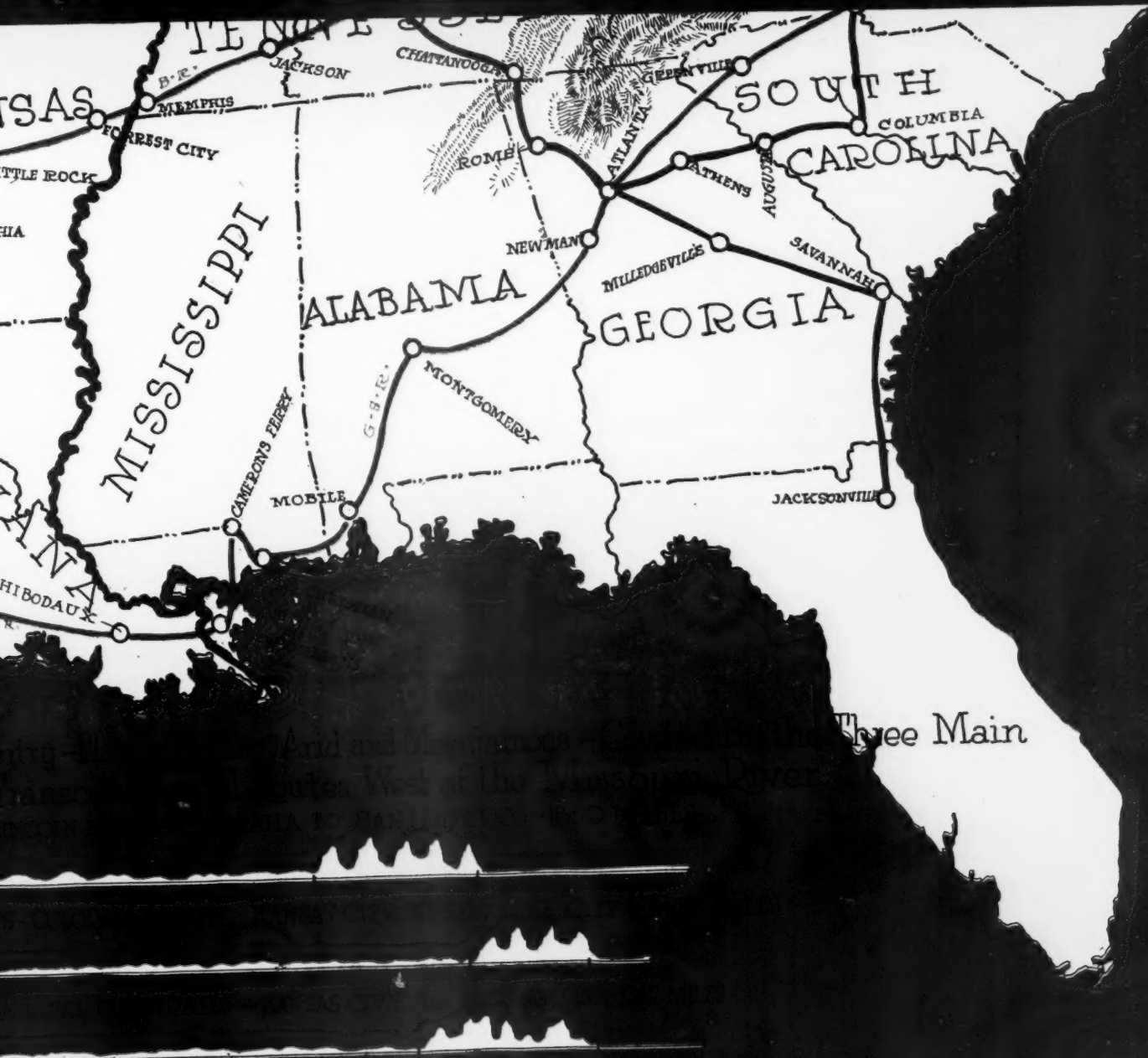
ATLANTIC NEW YORK — LINCOLN HIGHWAY — 3504 MILES



NATIONAL OLD ROUTE — 3125 MILES







CLIMATE

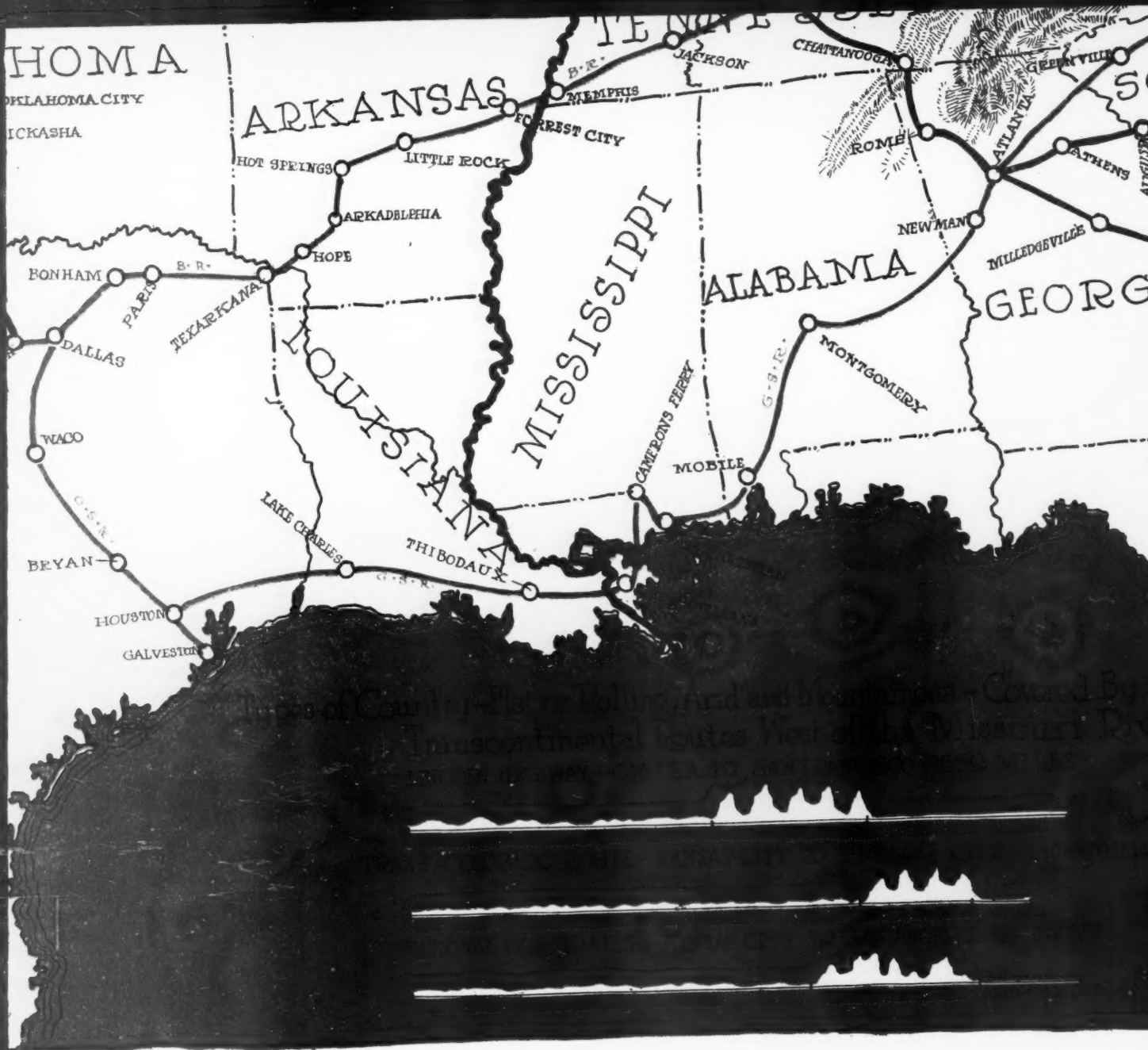
Showing Mean
Annual Rainfall
in the States
New York and
Main Trans.

Illinois
Indiana
Ohio
Pennsylvania
Maryland
Virginia
North Carolina
South Carolina
Georgia
Florida

Alabama
Louisiana
Mississippi
Arkansas
Tennessee
Kentucky
West Virginia
Ohio
Pennsylvania
Maryland
Virginia
North Carolina
South Carolina
Georgia
Florida

California
Oregon
Washington
Idaho
Montana
Wyoming
Nebraska
Kansas
Colorado
New Mexico
Arizona
Texas
Louisiana
Mississippi
Alabama
Georgia
Florida

North Carolina
South Carolina
Georgia
Florida
Alabama
Louisiana
Mississippi
Arkansas
Tennessee
Kentucky
West Virginia
Ohio
Pennsylvania
Maryland
Virginia
North Carolina
South Carolina
Georgia
Florida



OKLAHOMA
OKLAHOMA CITY
MCKASHA

ARKANSAS

HOT SPRINGS
LITTLE ROCK
ARKADBLPHIA

LOUISIANA

MISSISSIPPI

ALABAMA

GEORGIA

FOONHAM
PARS
TEXARKANA
DALLAS
WACO
BRYAN
HOUSTON
GALVESTON

LAKE CHARLES
THIBODAU

CANTON'S FERRY
MOBILE

MONTGOMERY

JACKSON
CHATTANOOGA
ROME
ATLANTA
GREEN VILL
ATHENS
NEWMAN
MILLEDGEVILLE



CLIMATIC TABLE

Showing Mean Temperature and Precipitation During the 5 Touring Months in the States West of the Mississippi River That Are Crossed by the Three Main Transcontinental Routes.

LINCOLN HIGHWAY

| | | May | June | July | Aug. | Sept. |
|-----------|--------------|-----|------|------|------|-------|
| Illinois | Mean temp. | 57 | 61 | 72 | 78 | 67 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Indiana | Mean temp. | 58 | 62 | 73 | 79 | 68 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Kentucky | Mean temp. | 59 | 63 | 74 | 80 | 69 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Ohio | Mean temp. | 60 | 64 | 75 | 81 | 70 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Michigan | Mean temp. | 61 | 65 | 76 | 82 | 71 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Minnesota | Mean temp. | 62 | 66 | 77 | 83 | 72 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Wisconsin | Mean temp. | 63 | 67 | 78 | 84 | 73 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Nebraska | Mean temp. | 64 | 68 | 79 | 85 | 74 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Colorado | Mean temp. | 65 | 69 | 80 | 86 | 75 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |

TRANS-COLORADO ROUTE

| | | | | | | |
|-----------|--------------|-----|-----|-----|-----|-----|
| Illinois | Mean temp. | 61 | 70 | 78 | 75 | 67 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Indiana | Mean temp. | 62 | 71 | 79 | 76 | 68 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Kentucky | Mean temp. | 63 | 72 | 80 | 77 | 69 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Ohio | Mean temp. | 64 | 73 | 81 | 78 | 70 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Michigan | Mean temp. | 65 | 74 | 82 | 79 | 71 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Minnesota | Mean temp. | 66 | 75 | 83 | 80 | 72 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Wisconsin | Mean temp. | 67 | 76 | 84 | 81 | 73 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Nebraska | Mean temp. | 68 | 77 | 85 | 82 | 74 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Colorado | Mean temp. | 69 | 78 | 86 | 83 | 75 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |

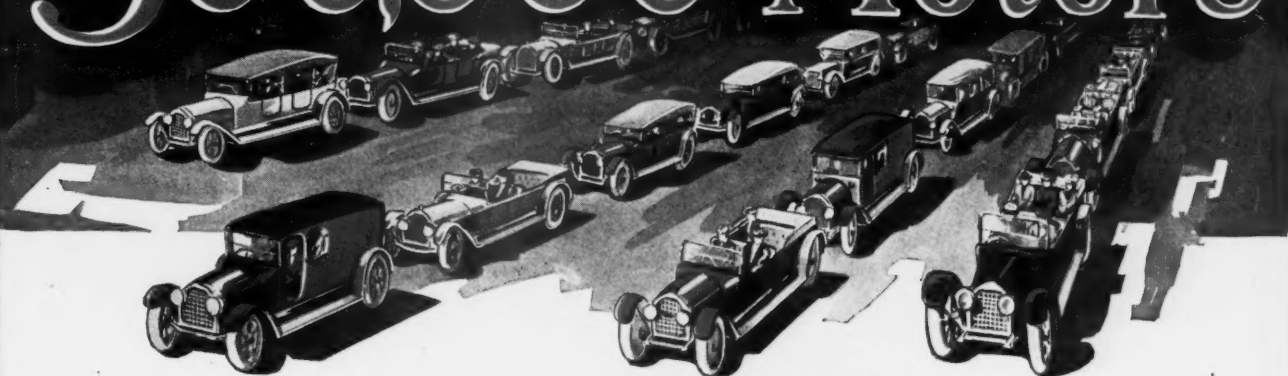
OLD TRAILS ROUTE

| | | | | | | |
|-----------|--------------|-----|-----|-----|-----|-----|
| Illinois | Mean temp. | 61 | 70 | 78 | 75 | 67 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Indiana | Mean temp. | 62 | 71 | 79 | 76 | 68 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Kentucky | Mean temp. | 63 | 72 | 80 | 77 | 69 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Ohio | Mean temp. | 64 | 73 | 81 | 78 | 70 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Michigan | Mean temp. | 65 | 74 | 82 | 79 | 71 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Minnesota | Mean temp. | 66 | 75 | 83 | 80 | 72 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Wisconsin | Mean temp. | 67 | 76 | 84 | 81 | 73 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Nebraska | Mean temp. | 68 | 77 | 85 | 82 | 74 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Colorado | Mean temp. | 69 | 78 | 86 | 83 | 75 |
| | Av. rainfall | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |

These figures are based on a period of 20 years and are taken from statistics gathered by the United States Meteorological Survey.

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